

EXHIBIT 44

CONFIDENTIAL

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

SECURITIES AND EXCHANGE)
COMMISSION,)
Plaintiff,)
v.)
Case No.)
RIO TINTO PLC, RIO TINTO) 17-cv-07994-AT-DCF
LIMITED, THOMAS ALBANESE,)
and GUY ROBERT ELLIOTT,)
Defendants.)
_____)

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VIDEO DEPOSITION OF GLENN HUBBARD, PH.D.
VIA VIDEOCONFERENCE
Friday, June 26, 2020

Reported by:
Lori J. Goodin, RPR, CLR, CRR,
RSA, California CSR #13959
Job No. 200626LJG

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1 UNITED STATES DISTRICT COURT
 2 SOUTHERN DISTRICT OF NEW YORK
 3

4 SECURITIES AND EXCHANGE)
 COMMISSION,)

5)
 Plaintiff,)

6)
 v.)

7) Case No.
 RIO TINTO PLC, RIO TINTO) 17-cv-07994-AT-DCF
 8 LIMITED, THOMAS ALBANESE,)
 and GUY ROBERT ELLIOTT,)

9)
 Defendants.)

10 _____)
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 12
 13

14 Deposition of GLENN HUBBARD, PH.D.,
 15 taken on behalf of Plaintiff, at
 16 Washington, D.C., beginning at 9:29 a.m.
 17 and ending at 5:20 p.m. on Friday,
 18 June 26, 2020, before LORI J. GOODIN,
 19 RPR, CLR, CRR, RSA, California CSR #13959.
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 21
 22
 23
 24
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ALSO PRESENT:

Guy Robert Elliot, Defendant

Thomas Albanese, Defendant

Kevin Gold Analysis Group

Nishi Sinha, Analysis Group

Glen Fortner, Videographer

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GLENN HUBBARD, PH.D.

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Washington, D.C., Friday, June 26, 2020

9:29 a.m. - 5:20 p.m.

* * *

09:28:28 5 THE VIDEOGRAPHER: Here begins Tape
09:28:30 6 Number 1 in the videotaped deposition of
09:28:35 7 Dr. Glenn Hubbard, in the matter of
09:28:38 8 Securities and Exchange Commission, v Rio
09:28:42 9 Tinto, PLC, et al. in the United States
09:28:48 10 District Court for the Southern District of
09:28:50 11 New York, Case Number 17-cv-07994-18-DCF.

09:29:05 12 Today's date is June 26, 2020. The
09:29:11 13 time on the video monitor is 9:29 eastern
09:29:15 14 time.

09:29:16 15 The videographer today is Glen
09:29:23 16 Fortner representing Gradillas Court
09:29:26 17 Reporting. This deposition is being
09:29:28 18 conducted by WebEx, and being recorded in
09:29:32 19 Tyson's Corner, Virginia.

09:29:33 20 Counsel will be noted on the
09:29:35 21 stenographic record.

09:29:40 22 The court reporter today is Lori
09:29:43 23 Goodin representing Gradillas Court Reporting.

24 Will the reporter please swear in
25 the witness.

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* * *

Whereupon,

GLENN HUBBARD, PH.D.,

a witness called for examination, having been
first duly sworn, was examined and testified as
follows:

* * *

MR. BEDNAR: And, Mr. Kirsch, did
you want to put something on the record?

MR. KIRSCH: Thanks so much, Tom.

Yes, just to note that the reason Dr. Hubbard
appears to be taking the video from home, as
we all are, is because we are, in fact, at
home due to the pandemic. Thank you.

* * *

EXAMINATION

BY MR. BEDNAR:

Q. Dr. Hubbard, good morning. My name
is Tom Bednar. I am an attorney for the
Securities and Exchange Commission.

I wanted to go over a few sort of
basic ground rules related to the fact that we
are all doing this from our respective homes.

Were you provided with a copy of
certain stipulations that the parties entered

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09:30:41 1 into with respect to these depositions?

09:30:42 2 A. Yes, sir.

09:30:44 3 Q. Okay. And, did you have a chance to
09:30:46 4 go over those with some of the counsel that are
09:30:49 5 present on the line today?

09:30:50 6 A. I don't recall that. I went over
09:30:54 7 them with counsel. But, I am familiar with them,
09:30:56 8 yes.

09:30:57 9 Q. Sure. And do you understand the
09:30:59 10 stipulations that apply to the deposition?

09:31:01 11 A. I do.

09:31:02 12 Q. Okay. And, did you receive hard
09:31:08 13 copies of exhibits that the SEC indicated that it
09:31:13 14 may use today?

09:31:15 15 A. Yes, I have three binders, almost as
09:31:18 16 tall as I am right by me, which contain all of
09:31:22 17 the exhibits by number. So, it should be easy
09:31:24 18 for me to refer to them as you are.

09:31:26 19 Q. Okay. Don't let those fall over
09:31:29 20 because they may crush you.

09:31:31 21 I will also be able to display
09:31:34 22 exhibits on the screen which I will do so that
09:31:36 23 the parties all can see what page we are on.
09:31:39 24 Whatever is easiest for you, you can feel free
09:31:42 25 to do.

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09:31:42 1 Do you have any other materials with
09:31:44 2 you today?

09:31:45 3 A. No, just these massive binders.

09:31:48 4 Q. Okay. If at any point during the
09:31:55 5 questioning you need a break, please feel free to
09:31:58 6 let me know.

09:31:58 7 One thing that we have learned in
09:32:03 8 these remote video depositions is that it seems
09:32:08 9 to be a little easier than usual for people to
09:32:11 10 inadvertently talk over each other, particularly
09:32:14 11 if there is a video lag.

09:32:16 12 So, I just ask that you try to let
09:32:18 13 me finish my questions. I will certainly try to
09:32:20 14 let you finish your answers before I proceed.
09:32:22 15 That also allows time for any of the counsel for
09:32:25 16 the parties to interpose objections.

09:32:29 17 We can agree at the outset, counsel,
09:32:31 18 that if counsel for one party objects, that
09:32:36 19 preserves the objections for all parties. You
09:32:39 20 don't need to all object.

09:32:40 21 Mr. Kirsch, do you know, will you be
09:32:46 22 sort of the primary objecter, or could it be
09:32:49 23 anyone?

09:32:50 24 MR. KIRSCH: It could be anyone.

09:32:50 25 MR. BEDNAR: Okay.

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09:32:55 1 MR. KIRSCH: But, certainly we agree
09:32:56 2 an objection for one is an objection for all.

09:32:59 3 MR. BEDNAR: Of course. And the
09:32:59 4 only reason I ask that is, counsel, I would
09:33:01 5 ask that if you do object, please just state
09:33:04 6 your last name with your objection.

09:33:05 7 That makes it easier for the
09:33:07 8 reporter, who may not have your video in
09:33:10 9 front of her. And it also means that I don't
09:33:13 10 have to have an extended call. It usually
09:33:16 11 means that everyone forgets the question and
09:33:19 12 I have to ask it again and object to it
09:33:21 13 again.

09:33:21 14 BY MR. BEDNAR:

09:33:21 15 Q. And with that, I think we can go
09:33:23 16 ahead, Doctor.

09:33:33 17 Dr. Hubbard, I wanted to just start
09:33:35 18 with something very basic and put an exhibit up
09:33:35 19 on the screen to identify that we will be
09:33:43 20 referring to frequently throughout the course of
09:33:43 21 today.

09:33:43 22 (Whereupon, previously marked
09:33:43 23 Exhibit 224, first referral.)

09:33:43 24 BY MR. BEDNAR:

09:33:44 25 Q. This has been marked previously as

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09:33:45 1 Defendant's Exhibit 224.

09:33:51 2 And do you recognize that exhibit?

09:33:53 3 A. Yes, I do. It is the expert report
09:33:56 4 that I filed. I pulled that one out of the
09:33:58 5 binder, figuring you might have a few questions.

09:34:09 6 Q. And I'm going to skip to the 98th
09:34:14 7 page of the PDF, which is the 94th page of your
09:34:18 8 report. Is that your signature?

09:34:18 9 A. Yes, it is.

09:34:19 10 Q. And then scrolling up to the page
09:34:19 11 above. It is a 93-page report; is that correct?

09:34:21 12 A. Yes, before getting to some
09:34:24 13 supplementary material text, yes.

09:34:26 14 Q. Sure. And you can see at the top of
09:34:28 15 the screen, the PDF is 287 pages, which does
09:34:32 16 include the appendices and the exhibits that are
09:34:34 17 in the back.

09:34:35 18 Doctor, in preparing this report,
09:34:44 19 did you include in the report all opinions that
09:34:46 20 you reached in your work?

09:34:50 21 A. Certainly if the question is at the
09:34:52 22 time that I wrote the report, the answer is yes.

09:34:55 23 Q. Have you come to any other opinions
09:34:57 24 since you submitted the report in February?

09:34:59 25 A. I have.

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09:35:00 1 Q. On what subjects have you come to
09:35:02 2 new opinions?

09:35:05 3 A. I came to some additional opinions
09:35:08 4 actually following the deposition discussion with
09:35:12 5 Dr. Metz on topics that came up there, obviously
09:35:16 6 subsequent to my report or even his rebuttal
09:35:19 7 report.

09:35:21 8 Q. And what topics did you come to have
09:35:24 9 opinions on?

09:35:24 10 A. Opinions on sensitivity to different
09:35:27 11 formulation of various indices that Dr. Metz and
09:35:36 12 I have disagreed on.

09:35:43 13 Q. And what indices are you thinking
09:35:46 14 of?

09:35:46 15 A. I'm thinking of in particular about
09:35:51 16 the choice of an industry index. As you know,
09:35:51 17 Dr. Metz and I have a number of disagreements
09:35:54 18 there.

09:35:54 19 But, in particular, he had raised
09:35:56 20 some concerns about the HSBC Mining Index, which
09:35:59 21 I use in my report.

09:36:00 22 I don't think those concerns are
09:36:03 23 important. But, I did sensitivity analysis, some
09:36:06 24 of which he could have easily done himself,
09:36:10 25 others are more difficult, to bolster my results,

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09:36:15 1 and no conclusion changed.

09:36:17 2 Q. Did you come to any additional
09:36:22 3 opinions with respect to other industry indices
09:36:26 4 that were referred to in any of the other expert
09:36:28 5 reports?

09:36:28 6 A. Depending on what you mean by that
09:36:30 7 question, yes. So, to the question about the
09:36:36 8 HSBC index, I went to IHS Market, which now
09:36:40 9 maintains the successor to that index, and was
09:36:44 10 able to obtain the individual --

09:36:46 11 Q. And, Doctor, I'm sorry. Maybe I
09:36:48 12 should clarify.

09:36:48 13 I'm sorry to cut you off. I should
09:36:50 14 clarify my question. I'm referring to did you
09:36:52 15 come to any opinions with respect to other
09:36:56 16 industry indices besides the HSBC index?

09:36:59 17 THE WITNESS: Well, yes and no. It
09:37:00 18 is in that context.

09:37:02 19 I did also come to opinions on the
09:37:06 20 H8 measure and other HN measures, if you
09:37:09 21 will, numbers of companies.

09:37:10 22 But, it is all derivative of his
09:37:13 23 concerns about HSBC. That is why I was
09:37:15 24 starting to answer the way I did. But, I
09:37:17 25 apologize.

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09:37:21 1 BY MR. BEDNAR:

09:37:21 2 Q. And so specifically what did you do
09:37:22 3 with respect to the H8 group of eight comparator
09:37:27 4 firms?

09:37:27 5 A. Well, for the H8, he had raised a
09:37:30 6 concern about being in the data every year, as
09:37:38 7 opposed to just one year. He had constructed, of
09:37:42 8 course, a meta index, called H16.

09:37:45 9 It was anybody who had been in at
09:37:45 10 least one year. He seemed to criticize me on not
09:37:48 11 having every year.

09:37:48 12 So, I went through seven of the
09:37:50 13 eight were there every year. Newmont isn't, so I
09:37:54 14 took it out. And I get essentially the same, the
09:37:57 15 same result.

09:38:01 16 Q. And Newmont is a gold company?

09:38:04 17 A. Yes, it is a general mining company,
09:38:06 18 but yes, gold.

09:38:08 19 Q. Did you run any sensitivities where
09:38:15 20 you added one or more companies to that eight-
09:38:18 21 company list?

09:38:19 22 A. I didn't -- Dr. Metz, I think, in
09:38:23 23 his deposition had mentioned adding Teck and
09:38:26 24 Peabody, if I am remembering.

09:38:28 25 I did add those. And, he would be

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09:38:33 1 correct I think with regard to Tech, that if you
09:38:35 2 added it, you could get a statistically
09:38:39 3 significant return.

09:38:40 4 But, as you know, I don't think that
09:38:41 5 is appropriate, nor frankly do I think the whole
09:38:45 6 exercise was beneficial.

09:38:51 7 Q. Why not?

09:38:52 8 A. Well, there is no economic question
09:38:55 9 facing the court that this part of his report
09:38:56 10 addresses.

09:38:56 11 The question of whether the
09:38:59 12 acquisition was accreted has absolutely nothing
09:39:02 13 to do, nothing from an economic perspective, with
09:39:05 14 the question of the reaction to an impairment.

09:39:08 15 The acquisition could have been
09:39:10 16 accreted. It could have been exactly the right
09:39:12 17 price, or it could have been value destroying.

09:39:16 18 But, in any of those cases, the
09:39:19 19 impairment discussion could have been analyzed.

09:39:21 20 So, that part of the report simply
09:39:23 21 has nothing to do with an economic question I
09:39:26 22 understand.

09:39:27 23 Q. You don't think the question of
09:39:40 24 whether the market responded positively to the
09:39:42 25 Riversdale acquisition is relevant to the

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09:39:42 1 question of the eventual write-down of that
09:39:44 2 acquisition?

09:39:44 3 A. It most certainly is not. And so,
09:39:47 4 for example, we know from most studies that
09:39:52 5 acquisitions generally aren't accreted. It
09:39:54 6 wouldn't matter.

09:39:55 7 Let's suppose the firm paid exactly
09:39:57 8 the right price. And so if you paid exactly the
09:39:59 9 market's definition of fair market value, you
09:40:02 10 wouldn't expect a stock price increase.

09:40:04 11 Yet, arguably, you could still
09:40:07 12 analyze an impairment. Frankly, you could
09:40:09 13 analyze an impairment if you had overpaid the
09:40:13 14 firm.

09:40:13 15 So, if the question before the court
09:40:15 16 is about an impairment, which I think is an
09:40:18 17 economy statement, then this earlier discussion
09:40:20 18 simply has nothing to do with that from an
09:40:22 19 economic perspective.

09:40:24 20 If it is there, I assume there is
09:40:25 21 some legal argument, with zero economic relevance.

09:40:28 22 Q. When did you reach the opinion that
09:40:32 23 the issue of whether the acquisition was accreted
09:40:36 24 had no economic relevance?

09:40:39 25 A. I think the moment -- it is

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09:40:53 1 absolutely silly.

09:40:54 2 Q. And do you state that opinion in
09:40:56 3 your report in this case?

09:40:57 4 A. Well, in my report I simply go
09:41:00 5 through the problems with what Dr. Metz did, as a
09:41:05 6 rebuttal to him. That is the assignment that I
09:41:08 7 had.

09:41:08 8 But, the whole exercise isn't worth
09:41:11 9 doing, from an economic perspective. A court may
09:41:14 10 find it valuable for some other reason. That is
09:41:16 11 fine. But not from an economic perspective.

09:41:19 12 Q. Is there a particular reason why you
09:41:25 13 didn't disclose your opinion that the exercise
09:41:28 14 that you were responding to in your rebuttal
09:41:31 15 report was not worth doing?

09:41:33 16 MR. KIRSCH: Objection, lack of
09:41:34 17 foundation.

09:41:38 18 THE WITNESS: No, I think it is
09:41:40 19 pretty clear from the tone of my report what
09:41:42 20 I think of Dr. Metz's exercises.

09:41:44 21 I guess I didn't see the need. I
09:41:46 22 think it would -- the point I'm making is an
09:41:49 23 Econ 101 point. It is not difficult.

09:41:58 24 BY MR. BEDNAR:

09:41:58 25 Q. And is that based on your conclusion

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09:42:04 1 that there was no statistically significant price
09:42:07 2 or action for impairment on January 17th, of
09:42:11 3 2013?

09:42:11 4 A. No, that is a different point. That
09:42:13 5 is on Dr. Metz's playing field, what do I think
09:42:16 6 about what he did.

09:42:17 7 This is a larger point that the
09:42:18 8 exercise simply isn't worth doing because knowing
09:42:21 9 the answer to the question has no information for
09:42:23 10 the question, I think is the one before the
09:42:26 11 court, at least from an economic perspective.

09:42:29 12 Q. Have you come to any other opinions
09:42:39 13 since you submitted your report in February?

09:42:41 14 A. Yes, sir.

09:42:43 15 Q. On what topics?

09:42:45 16 A. Again, going back to the industry
09:42:49 17 index, I had started to talk about work with IHS
09:42:54 18 Markit data, and then we got on to these other
09:42:57 19 subjects.

09:42:57 20 IHS Markit maintains a successor to
09:43:03 21 the index. I was able to get the individual
09:43:05 22 elements and back out Rio Tinto from the index,
09:43:11 23 or the dates for the event studies, which means I
09:43:15 24 don't have to worry about any endogeneity by
09:43:20 25 construction. And I get potentially the same

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09:43:23 1 answer.

09:43:23 2 I also noted in forming extra
09:43:27 3 opinions for myself that if Dr. Metz were really
09:43:31 4 concerned about endogeneity and thought it was a
09:43:37 5 big deal, he could have induced endogeneity. In
09:43:38 6 other words, he could have added Rio Tinto to
09:43:40 7 other indices and see if it makes the difference.

09:43:43 8 I can spare him the trouble. I did
09:43:45 9 that and it doesn't.

09:43:50 10 I have other opinions, too, if of
09:43:54 11 use.

09:43:56 12 Q. What other opinions have you come
09:43:58 13 to?

09:43:58 14 A. Another exercise I did just because
09:44:01 15 I knew Dr. Metz could have, if he wished, was to
09:44:05 16 look at the top ten elements of HSBC in order to
09:44:15 17 see -- with Rio Tinto, in order to see using the
09:44:23 18 ADR data, whether I get a different answer.

09:44:25 19 Because that is by definition not
09:44:27 20 subject to his endogeneity critique. There is no
09:44:30 21 Rio Tinto. And it is by definition not subject
09:44:32 22 to the timing issue.

09:44:33 23 So, I'm using the ADRs, and I get
09:44:36 24 essentially the same answer that I got before.

09:44:38 25 That I could do from a fact sheet.

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09:44:40 1 Subsequently, since I got the market
09:44:42 2 data, I did top 15. That also gives the same
09:44:45 3 answer that I presented in the report.

09:44:46 4 So, there were ways Dr. Metz could
09:44:49 5 have used data, both that he had available to him
09:44:52 6 or data that he could have obtained, as I did, if
09:44:55 7 he wanted to check those.

09:45:18 8 Q. Dr. Hubbard, did you in your work on
09:45:22 9 this case, have you conducted evaluation of
09:45:26 10 Riversdale as of April of 2011?

09:45:29 11 MR. KIRSCH: Sorry, Tom. I couldn't
09:45:30 12 hear you.

09:45:31 13 BY MR. BEDNAR:

09:45:32 14 Q. Dr. Hubbard, as part of your work on
09:45:34 15 this case, have you conducted a valuation of
09:45:37 16 Riversdale as of April of 2011?

09:45:39 17 MR. KIRSCH: Thank you.

09:45:40 18 THE WITNESS: If I'm understanding
09:45:43 19 your question, no I did not. I was not asked
09:45:46 20 to do that.

09:45:47 21 BY MR. BEDNAR:

09:45:52 22 Q. If asked to do that, could you have
09:45:54 23 done so?

09:45:55 24 A. If I had the requisite information,
09:45:59 25 I could do so.

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09:45:59 1 Of course, it would be the valuation
09:46:01 2 as I see it. Would be one person's view, but I
09:46:06 3 could certainly do it.

09:46:10 4 Q. What information would you need to
09:46:12 5 conduct evaluation?

09:46:13 6 A. If one wanted to value something,
09:46:16 7 depending on the method you use, you could use a
09:46:19 8 discounted cash flow analysis, which in this case
09:46:22 9 would require assumptions very long in the future
09:46:26 10 about commodity prices, about GDP, about costs,
09:46:31 11 and so on.

09:46:32 12 Lots of elements go into a forecast
09:46:35 13 for valuation. Again not something I was asked
09:46:38 14 to do.

09:46:38 15 (Exhibit Number 1101
09:46:38 16 marked for identification.)

09:46:54 17 BY MR. BEDNAR:

09:46:54 18 Q. Doctor, if I can take you to
09:47:13 19 Exhibit 1101. This is Appendix --

09:47:14 20 A. 1101?

09:47:15 21 Q. Sure. And I also can put it on the
09:47:18 22 screen. This is Appendix B to your report.

09:47:21 23 A. Oh, that I have. I have Appendix B.
09:47:25 24 Okay.

09:47:25 25 Q. Doctor, does Appendix B list all of

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09:47:41 1 the materials that you considered in developing
09:47:43 2 your February 2020 report?

09:47:45 3 A. It should, beyond just general
09:47:48 4 knowledge, yes.

09:47:51 5 Q. What do you mean by general
09:47:53 6 knowledge?

09:47:54 7 A. In other words, I'm here as an
09:47:56 8 expert witness. So, these are things to look at.
09:47:58 9 But I also bring my own lens as an economist.

09:48:01 10 Q. Okay. It is a 23-page document. It
09:48:12 11 has up to 1,500 items on it.

09:48:14 12 Did you review all of the items on
09:48:16 13 this list?

09:48:18 14 A. I certainly worked with staff
09:48:20 15 working under my direction to develop the record.
09:48:24 16 I can't claim to have read every word in every
09:48:26 17 item, no.

09:48:28 18 But, the instructions on how to do
09:48:31 19 so both came from me, and our document and
09:48:37 20 report.

09:48:44 21 Q. And this was staff working for you
09:48:47 22 at Analysis Group; is that correct?

09:48:49 23 A. Yes, sir.

09:48:50 24 Q. How many people work on your team at
09:48:52 25 Analysis Group?

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09:48:53 1 A. You know, I really don't know how
09:48:56 2 many people altogether.

09:48:59 3 Q. Is it more than ten? Less than ten?

09:49:09 4 A. My answer is I don't know. I think
09:49:11 5 a corollary to that I wouldn't know. But, I
09:49:16 6 think it would be more than ten, but I really
09:49:19 7 don't know.

09:49:19 8 Q. Who would know?

09:49:20 9 A. Analysis Group certainly would know.

09:49:26 10 Q. Did you have a project manager or a
09:49:28 11 case manager that would know?

09:49:30 12 A. I do.

09:49:31 13 Q. Who was that?

09:49:33 14 A. Mr. Gold, like the metal. First
09:49:43 15 name, Kevin.

09:49:48 16 Q. Do you know about how many hours you
09:49:50 17 spent developing your report?

09:49:54 18 A. Going from memory, I think
09:49:56 19 through -- you mean through the preparation of
09:49:58 20 the report?

09:49:59 21 Q. Yes.

09:50:00 22 A. I would guess around 100, but I
09:50:03 23 don't really recall the exact number.

09:50:06 24 Q. And then about how many hours did
09:50:16 25 you spend preparing for the deposition?

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09:50:18 1 A. Well, if you mean by that, since the
09:50:21 2 report, i.e. reading Dr. Metz's work and
09:50:26 3 deposition, plus literal preparation, I would say
09:50:28 4 another, going from memory, 70 or 80, maybe.

09:50:39 5 Q. I'm going to take you to the last
09:50:42 6 page of Appendix B. In the middle of the page,
09:50:53 7 there is an entry 1634, under the header Data.
09:50:58 8 It says Bloomberg.

09:50:59 9 A. Yes.

09:50:59 10 Q. What kind of Bloomberg data is
09:51:03 11 referred to in that entry?

09:51:05 12 A. I don't remember whether that was
09:51:08 13 used for news information or data.

09:51:12 14 I know we got most of the data from
09:51:21 15 Cap IQ. So, I'd have to go back and check. It
09:51:22 16 is probably in the individual indices, but I
09:51:25 17 don't recall.

09:51:28 18 Q. And I'm sorry. Where did you get
09:51:46 19 most of your price information for security
09:51:54 20 prices from?

09:51:54 21 A. They would be actually in the
09:51:56 22 exhibits, but my memory is Capital IQ and
09:51:59 23 possibly Bloomberg. We certainly used Factiva
09:52:03 24 more for the raw data. We used Thompson ONE for
09:52:07 25 some of the information, too.

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09:52:09 1 So, a variety of sources.

09:52:13 2 Q. The Bloomberg data that is cited
09:52:17 3 here, was that produced with your report?

09:52:19 4 A. I don't know. I would assume so.

09:52:45 5 Q. Doctor, I want to ask you some
09:52:47 6 questions about just some basic principles of
09:52:50 7 conducting event studies.

09:53:10 8 Can an event study be used to tell
09:53:14 9 you anything on a day on which there are notes?

09:53:17 10 A. I'm not sure what you mean by that.
09:53:19 11 You could use an event study. It wouldn't be
09:53:22 12 very meaningful, because normally an event study
09:53:26 13 is used on days where you are testing.

09:53:33 14 You can run a regression, if that is
09:53:36 15 your question. It wouldn't be very meaningful.

09:53:38 16 Q. It wouldn't tell you very much in
09:53:40 17 the absence of something then?

09:53:41 18 A. If I'm understanding your question,
09:53:44 19 no.

09:53:44 20 Q. Can you use an event study to
09:53:49 21 evaluate the effect of an omission, information
09:53:56 22 that is not disclosed?

09:54:00 23 MR. KIRSCH: Are you talking about
09:54:01 24 the effect on a security price?

09:54:03 25 MR. BEDNAR: Yes.

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09:54:03 1 BY MR. BEDNAR:

09:54:05 2 Q. Can you use an event study to
09:54:08 3 evaluate the effect on security price for
09:54:11 4 specific information that is not disclosed, that
09:54:14 5 is omitted.

09:54:15 6 A. Well, it would depend on fact and
09:54:17 7 circumstances. If it is subsequently disclosed,
09:54:23 8 you could, I suppose, look at a reaction if that
09:54:26 9 is your question.

09:54:27 10 I'm not sure what you are asking.
09:54:28 11 But, if that is your question, that is the answer.

09:54:42 12 Q. Before conducting an event study, is
09:54:46 13 it important to determine whether the security
09:54:48 14 that you are analyzing trades in an efficient
09:54:51 15 market?

09:54:53 16 A. In general, yes. The whole
09:54:56 17 theoretical background for an event study is that
09:55:00 18 you are measuring the market's response to news.

09:55:04 19 For that to have economic meaning,
09:55:06 20 you would need something like the semi-strong
09:55:10 21 version of the efficient market hypothesis. So,
09:55:15 22 yes, it is a joint test if that is your question.

09:55:23 23 Q. And what factors are important in
09:55:25 24 determining whether the market for a particular
09:55:29 25 security is sufficient?

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09:55:30 1 A. Well, courts have looked at a
09:55:33 2 variety of factors. Economists generally look at
09:55:36 3 similar ones, having to do with the liquidity of
09:55:40 4 the market, which is stock trades, whether they
09:55:43 5 are numbers of -- the numbers of analysts that
09:55:46 6 follow the stock, volumes. You know, there are a
09:55:50 7 variety of metrics that people use.

09:55:51 8 I think both Dr. Metz and I conclude
09:55:53 9 the same thing that the market for the equity
09:55:55 10 here is sufficient.

09:55:57 11 I added a few factors, I think
09:55:59 12 beyond his, but they all point the same
09:56:02 13 direction.

09:56:03 14 Q. Do you recall what factors you
09:56:04 15 added?

09:56:05 16 A. I believe the short interest ratio.
09:56:08 17 I don't remember. They are in the report. If it
09:56:11 18 is important, we can go to that.

09:56:17 19 Q. You said liquidity is a factor in
09:56:20 20 determining efficiency.

09:56:21 21 And in this context, what do you
09:56:23 22 mean by liquidity?

09:56:25 23 A. Again, courts look at different
09:56:30 24 things, bid-ask spreads, things like that. The
09:56:32 25 transactions cost. There is some economic

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09:56:36 1 concept, as a practical matter. Things like
09:56:38 2 bid-ask spreads.

09:56:40 3 Dr. Metz looked at most of those
09:56:43 4 factors and concluded that the market was
09:56:47 5 sufficient, and I don't disagree.

09:56:48 6 Q. So, can you explain in this context
09:56:50 7 what is meant by bid-ask spreads?

09:56:53 8 A. In other words, transactions cost
09:56:57 9 and trading stock. The higher transactions cost,
09:57:00 10 you might imagine a market isn't as efficient.

09:57:05 11 The smaller transactions cost, then
09:57:07 12 any new piece of information, that would profit
09:57:11 13 arbitrage trader to engage.

09:57:13 14 That is why economists focus on
09:57:15 15 transactions.

09:57:24 16 Q. And within this context, what do you
09:57:27 17 mean by volume is a consideration of determining
09:57:30 18 efficiency?

09:57:31 19 A. Courts often look at trading volume,
09:57:35 20 daily volume, weekly volume. Most of this
09:57:38 21 discussion of factors comes up in court cases,
09:57:42 22 which is why I keep referring to that, often in
09:57:45 23 Delaware. But, that is volume data are generally
09:57:49 24 looked at. Dr. Metz did.

09:57:55 25 Q. And the consideration that you just

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09:58:02 1 outlined, is it important to consider all of
09:58:05 2 those in determining market efficiency when
09:58:07 3 conducting an event study?

09:58:10 4 A. Well, ultimately your conclusion is
09:58:12 5 holistic. It is not like those factors have some
09:58:15 6 sort of rank ordering. A researcher looks at
09:58:18 7 them and makes a judgment. That is effectively
09:58:21 8 what Dr. Metz did.

09:58:23 9 And, to be honest, I don't disagree
09:58:25 10 with his conclusion that the market is efficient.

09:58:30 11 Q. And I think what I'm asking is, is
09:58:33 12 it your view that it is important to make a
09:58:35 13 determination of market efficiency when
09:58:40 14 conducting an event study?

09:58:41 15 A. You asked that earlier. So, it is
09:58:43 16 the same answer, yes.

09:58:45 17 Q. There were a few --

09:59:09 18 In terms of the mechanics of
09:59:10 19 conducting the event studies, there are a few
09:59:14 20 mechanical differences between the approach that
09:59:17 21 Dr. Metz took and the approach that you took.
09:59:19 22 And I wanted to ask you about those.

09:59:21 23 Dr. Metz excluded certain
09:59:25 24 announcement dates for earnings and I think
09:59:29 25 operations reviews.

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09:59:30 1 Do you recall that he did that in
09:59:32 2 his study?

09:59:33 3 A. I do.

09:59:34 4 Q. And you included those dates,
09:59:39 5 correct?

09:59:40 6 A. I did, but as a sensitivity I also
09:59:42 7 did it Dr. Metz's way and I get the same answer,
09:59:45 8 the same answer I get.

09:59:47 9 Q. Right. So, that choice in technique
09:59:50 10 did not make a difference to the outcome of
09:59:53 11 either report; is that correct?

09:59:54 12 A. That's correct.

09:59:54 13 Q. The outcome of either event study?

09:59:57 14 A. That is my finding, yes.

09:59:59 15 Q. And you expressed your -- or excuse
09:59:59 16 me.

10:00:01 17 You measured returns in terms of
10:00:04 18 logarithms, and he measures returns in terms of
10:00:08 19 percent; is that right?

10:00:09 20 A. I believe that is true.

10:00:10 21 Q. And, is that again another
10:00:13 22 difference in technique that does not affect the
10:00:15 23 outcome of the particular event studies?

10:00:18 24 A. I don't recall that that affected
10:00:20 25 the outcome of the event study.

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10:00:22 1 There -- most of the factors are the
10:00:26 2 ones we talked about earlier.

10:00:27 3 I don't recall that as making a
10:00:29 4 difference.

10:00:31 5 Q. And when conducting an event study,
10:00:33 6 I think that we have already sort of touched on
10:00:36 7 this, but do you agree that it is important to
10:00:37 8 use an industry index when conducting an event
10:00:41 9 study?

10:00:43 10 A. Well, it certainly really depends on
10:00:46 11 the purpose. Here it would be, certainly.

10:00:50 12 Q. Why do you say here it would be
10:00:52 13 important to use an industry index?

10:00:56 14 A. Well, because you are dealing with a
10:00:58 15 company in a particular sector who may have
10:01:02 16 correlated more with the sector than the overall
10:01:06 17 economy.

10:01:07 18 So, yes, it would be important to
10:01:08 19 use an industry index, provided you use an
10:01:11 20 industry index that has actual comparators.

10:01:16 21 Q. Let me pull up another exhibit.
10:01:33 22 This is 1116.

10:01:33 23 (Exhibit Number 1116
10:01:33 24 marked for identification.)

10:02:10 25 BY MR. BEDNAR:

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10:02:10 1 Q. And, Doctor, this is Exhibit 5 from
10:02:10 2 your report.

10:02:10 3 Oh, okay. It is up on the screen in
10:02:10 4 front of you. It is a one-page, and I can
10:02:10 5 enlarge the screen a little bit.

10:02:10 6 A. Okay.

10:02:10 7 Q. Can you see that all right?

10:02:10 8 A. Let me look at it on paper. It is a
10:02:11 9 little hard. You can start talking. I will find
10:02:11 10 it.

10:02:11 11 Q. So, the first question is easy, do
10:02:11 12 you recognize this to be Exhibit 5 from your
10:02:12 13 report?

10:02:13 14 A. Yes, that is correct.

10:02:17 15 Q. Did you create Exhibit 5?

10:02:18 16 A. I don't know what you mean by
10:02:21 17 created. I caused it to be created.

10:02:24 18 Q. Okay. Did you review it before it
10:02:26 19 was included in your report?

10:02:27 20 A. Yes.

10:02:27 21 Q. Okay. Did you review all of the
10:02:29 22 exhibits in the appendices to your report?

10:02:35 23 A. Yes.

10:02:35 24 Q. Now, looking at this exhibit, in his
10:02:41 25 two models, Dr. Metz obtains a 3 percent abnormal

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10:02:47 1 returns. And you get 1.25 percent in Column C
10:02:53 2 and 1.66 percent in Column D. Is that correct?

10:02:55 3 A. You read the numbers correctly. If
10:03:01 4 you are intending to attach an economic meaning,
10:03:04 5 1.25 is comparable to 3.02, that I can't do.
10:03:07 6 But, you read the numbers correctly.

10:03:12 7 Q. And I'm sorry. Can you explain the
10:03:14 8 caveat that you just stated?

10:03:16 9 A. In other words, statistically -- I'm
10:03:36 10 sorry.

10:03:36 11 My answer was, something -- in other
10:03:41 12 words, the two numbers I -- 1.25 and 1.66, one
10:03:46 13 can't reject the hypothesis there is 0.

10:03:49 14 That is the economic flavor. You
10:03:52 15 certainly read the number, the point estimate,
10:03:54 16 correct.

10:03:55 17 Q. And then, associated with the
10:03:58 18 abnormal returns, you see key statistics for the
10:04:05 19 abnormal returns, correct?

10:04:07 20 A. Yes, sir.

10:04:08 21 Q. Is there a standard in academic
10:04:10 22 literature for indicating statistical
10:04:14 23 significance of key statistics?

10:04:16 24 A. Generally, 95 --

10:04:17 25 MR. KIRSCH: Objection.

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10:04:18 1 THE WITNESS: I'm sorry.

10:04:20 2 MR. KIRSCH: You can answer. Go
10:04:22 3 ahead.

10:04:25 4 THE WITNESS: Generally a 95 percent
10:04:29 5 confidence level, which would be a key
10:04:31 6 statistic around 1.96.

10:04:31 7 BY MR. BEDNAR:

10:04:33 8 Q. Are you familiar with the standard
10:04:34 9 of applying one star to indicate statistical
10:04:39 10 significance at the 10 percent level, two stars
10:04:41 11 at the 5 percent level, and three stars at the
10:04:44 12 1 percent level?

10:04:46 13 A. Sure. I have done it myself.

10:04:50 14 Q. Okay. And so in academic
10:04:59 15 literature, if we were to follow that standard,
10:05:01 16 there will be two stars on the key statistics in
10:05:05 17 Dr. Metz's model, right?

10:05:07 18 A. That's correct.

10:05:07 19 Q. There would be no star for your
10:05:09 20 model in Column C. Correct?

10:05:13 21 A. That's correct.

10:05:14 22 Q. And one star for your model in
10:05:16 23 Column D. Right?

10:05:17 24 A. That is correct.

10:05:22 25 Q. And when you say that you have

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10:05:23 1 applied that convention from the academic
10:05:26 2 literature yourself, you have done that in papers
10:05:28 3 you have published, right?

10:05:29 4 A. Yes. Your earlier question was what
10:05:31 5 is the threshold that economists generally use.

10:05:33 6 The answer to that is 95 percent.
10:05:35 7 My experience in court as well.

10:05:36 8 But, everything is significant. The
10:05:38 9 question is at what level.

10:05:38 10 (Exhibit Number 1127
10:05:38 11 marked for identification.)

10:05:51 12 BY MR. BEDNAR:

10:05:51 13 Q. I am pulling up Exhibit 1127. This
10:05:54 14 is a paper authored by you and Darius Palia.

10:06:01 15 A. Okay.

10:06:02 16 Q. The title of this is Benefits of
10:06:05 17 Control, Managerial Ownership, and the Stock
10:06:07 18 Returns of Acquiring Firms.

10:06:08 19 Do you see that in front of you?

10:06:10 20 A. I do.

10:06:11 21 Q. I'm going to take you to the 10th
10:06:13 22 page of the PDF, which in the hard copy has
10:06:18 23 Page Number 791. I'm going to have you look at
10:06:23 24 Table 4.

10:06:27 25 A. Okay.

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10:06:27 1 Q. In that table, you see the key
10:06:30 2 statistic of 1.68 has a star next to it.

10:06:34 3 A. Yes, I think I indicated I do this
10:06:38 4 myself sometimes.

10:06:39 5 Q. Yes. And then -- I'm sorry. I took
10:06:48 6 you right off the page.

10:06:49 7 And then the footnote at the bottom
10:06:50 8 of the table says -- that is associated with that
10:06:53 9 star, says statistically significant at the
10:06:55 10 10 percent level. Just like we were discussing,
10:06:58 11 right?

10:06:58 12 A. Yes, that's my convention is also a
10:07:00 13 very common.

10:07:02 14 Q. Okay. And it is 1.68. Is the
10:07:05 15 cutoff value 1.645?

10:07:08 16 A. Something like that, yes.

10:07:11 17 Q. So, it is barely statistically
10:07:16 18 significant at the 10 percent level, right?

10:07:18 19 A. That is certainly true.

10:07:25 20 Q. If we go back one page, to the ninth
10:07:27 21 page of the PDF, Page 790 of the exhibit. And we
10:07:36 22 look at the last paragraph.

10:07:40 23 In the middle of the paragraph you
10:07:43 24 and your coauthor wrote, "We find that acquiring
10:07:47 25 firms with ownership levels greater than

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10:07:54 1 5 percent indeed perform diversifying
10:07:59 2 acquisitions, and this difference is
10:08:01 3 statistically significant at the 10 percent
10:08:04 4 level."

10:08:04 5 A. I see that.

10:08:05 6 Q. And then you went on to say, "This
10:08:07 7 result supports the diversification control
10:08:11 8 hypothesis."

10:08:11 9 Did I read that correctly?

10:08:12 10 A. Sure, at that significance level,
10:08:15 11 that would be true.

10:08:16 12 Q. And so in that academic paper you
10:08:18 13 reached a conclusion that the effect that you
10:08:22 14 were evaluating was supported by results at the
10:08:26 15 10 percent statistical significance level.
10:08:29 16 Correct?

10:08:29 17 A. My recollection is -- this paper is
10:08:31 18 old.

10:08:31 19 But, my recollection is that its
10:08:34 20 response to work by Mort, Schleifer and Vishny
10:08:38 21 that use the more significance levels. I would
10:08:41 22 have to go back and look. But, yes, that was the
10:08:43 23 conclusion.

10:08:44 24 Q. Sure. And you certainly didn't say
10:08:46 25 anything in this paper to reject the use of that

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10:08:49 1 significance level for evaluating your
10:08:51 2 conclusion, did you?

10:08:51 3 A. I was very clear that it is
10:08:56 4 significant at that level.

10:08:57 5 Q. And then if I take you back to
10:09:01 6 Table 5 -- or excuse me, Exhibit 5 from your
10:09:04 7 report.

10:09:05 8 Your key statistic is 1.85. Do you
10:09:11 9 see that?

10:09:12 10 A. Yes.

10:09:12 11 Q. And that is larger than the 1.68 key
10:09:17 12 statistic in your paper. Right?

10:09:18 13 A. Yes, I think we talked about that
10:09:20 14 earlier, yes.

10:09:21 15 Q. Right. So, this is also
10:09:25 16 statistically significant at the 10 percent
10:09:27 17 level?

10:09:27 18 A. At the 10 percent level that is
10:09:30 19 certainly true.

10:09:33 20 Q. And so following the logic from the
10:09:36 21 paper that we just showed to you, that would mean
10:09:42 22 that the results you found here with a key
10:09:44 23 statistic of 1.85 support the hypothesis that REO
10:09:48 24 stock return was unusually large. Correct?

10:09:51 25 A. I would say --

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10:09:52 1 MR. KIRSCH: Objection.

10:09:53 2 THE WITNESS: -- no, for a number of
10:09:55 3 reasons. First, as I told you, this whole
10:09:58 4 exercise fell from an economic perspective.

10:10:03 5 Second, there is another index with
10:10:05 6 a different finding. And, third, 95 percent
10:10:08 7 confidence is the confidence level Dr. Metz
10:10:11 8 himself suggested, and courts generally use.

10:10:14 9 So, I wouldn't answer in the
10:10:15 10 affirmative to your question, for those
10:10:17 11 reasons.

10:10:17 12 BY MR. BEDNAR:

10:10:19 13 Q. So, are you saying that results that
10:10:21 14 are statistically significant at the 10 percent
10:10:23 15 level but not at the 5 percent level offer no
10:10:27 16 evidence?

10:10:29 17 MR. KIRSCH: Objection. What do you
10:10:31 18 mean by offer no evidence? Of what?

10:10:36 19 BY MR. BEDNAR:

10:10:36 20 Q. You can answer.

10:10:39 21 MR. KIRSCH: If you understand the
10:10:41 22 question, Glenn, go ahead.

10:10:43 23 THE WITNESS: Well, it is pretty
10:10:44 24 vague, but I will answer what I think it is.

10:10:46 25 If the question is, is evidence of

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10:10:47 1 statistical significance -- you know, things
10:10:49 2 are statistically significant. The question
10:10:51 3 is at what level and how strong would a
10:10:54 4 conclusion be.

10:10:54 5 If I thought that this exhibit
10:10:56 6 referred to an economically interesting
10:10:58 7 exercise, and as you know I do not, I would
10:11:02 8 look at this and say boy, this seems
10:11:06 9 fragmented to me.

10:11:07 10 And then I would want to go through
10:11:08 11 the individual indexes and ask myself which
10:11:10 12 one I believe. That is the way I would do
10:11:14 13 it.

10:11:15 14 BY MR. BEDNAR:

10:11:16 15 Q. And so you agree that the level of
10:11:20 16 statistical significance goes to the strength of
10:11:22 17 the conclusion that can be drawn, and not the
10:11:26 18 fact that there is some information from the
10:11:28 19 result. Correct?

10:11:30 20 MR. KIRSCH: Objection.

10:11:31 21 THE WITNESS: Well -- I'm sorry.

10:11:33 22 If I am understanding your question,
10:11:38 23 there is always, quote, information. The
10:11:38 24 question is how meaningful is it.

10:11:40 25 There is a statistical answer to

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10:11:42 1 that which is confidence levels. This whole
10:11:44 2 exercise has no meaning from an economic
10:11:46 3 perspective which surely is the larger
10:11:49 4 question.

10:12:05 5 BY MR. BEDNAR:

10:12:05 6 Q. Doctor, with respect to your
10:12:16 7 analysis of ADR prices on January 17th, 2013, for
10:12:22 8 Rio Tinto, was it your conclusion that the
10:12:26 9 impairment disclosure of that day did not have a
10:12:29 10 measurable negative impact on Rio Tinto's ADR
10:12:32 11 price?

10:12:34 12 A. Yes. I believe I used words to that
10:12:37 13 effect, if not those very words.

10:12:39 14 Q. That is not the same thing as saying
10:12:43 15 that it had no impact. Right?

10:12:50 16 A. Well, I'm not sure. I mean, as an
10:12:53 17 economist, I don't know what you mean by an
10:12:54 18 impact if it cannot be measured.

10:13:02 19 Q. And what I'm asking is because you
10:13:04 20 were not able to measure a negative impact, is
10:13:07 21 that the same thing as saying that you conclude
10:13:09 22 that there was no impact at all?

10:13:13 23 A. Well, if I am understanding the
10:13:15 24 question is you know what I did was not just that
10:13:21 25 looked at the statistics, but also underlying

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10:13:23 1 information from news and analysts' reports.

10:13:27 2 And that enabled me to come to the
10:13:29 3 conclusion that I did.

10:13:30 4 But, what you are describing doesn't
10:13:32 5 sound like the scientific method to me. It
10:13:35 6 sounds like an assertion you can't falsify. That
10:13:41 7 is outside.

10:13:44 8 Q. And one of the things that you did
10:13:46 9 as part of your equity event study was to review
10:13:49 10 quite a large number of reports by the equity
10:13:53 11 analysts, right?

10:13:55 12 A. Yes, sir.

10:13:56 13 Q. And, can you describe for the court
10:14:00 14 what an equity analyst is?

10:14:04 15 A. Sure. An equity analyst would be
10:14:07 16 somebody who works for one of the Wall Street
10:14:10 17 firms to evaluate the business of, prospects of,
10:14:17 18 earnings of, and recommendations about price
10:14:21 19 targets for firms.

10:14:21 20 Analysts often specialize -- they
10:14:27 21 needn't, but often specialize in industries and
10:14:30 22 write about firms in those industries.

10:14:31 23 They spend their time getting
10:14:34 24 information, which the Wall Street firms then use
10:14:37 25 both on their own account and to provide to

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10:14:39 1 customers.

10:14:39 2 Q. And who were the customers of these
10:14:45 3 firms?

10:14:46 4 A. Well, it could be a variety of
10:14:47 5 things. It could be in Linnay work, it could be
10:14:53 6 wealth management, an acquiring of the firm. And
10:14:57 7 of course they go into analysts' information that
10:15:00 8 are tracked in public data sources anyway.

10:15:10 9 Q. And so is a significant part of the
10:15:13 10 purpose of analysts' reports is to make
10:15:16 11 recommendations on stocks to buy or hold or sell,
10:15:20 12 right?

10:15:20 13 A. Well, they certainly do make those
10:15:24 14 recommendations. They also will provide
10:15:30 15 quantitative information about what a price
10:15:33 16 target is. Usually a number 12 to 18 months away
10:15:36 17 from where we are standing from when we write the
10:15:38 18 report, or evaluate the company's earnings and
10:15:40 19 prospects.

10:15:41 20 They do all of that.

10:15:42 21 Q. Okay. So, in addition to
10:15:43 22 potentially providing specific recommendations,
10:15:45 23 they also provide information that investors can
10:15:48 24 use. Right?

10:15:50 25 A. Yes, should they wish to, yes.

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10:15:52 1 Q. And, many analysts provide, as the
10:15:55 2 name might suggest, analysis of what that
10:15:58 3 information needs. Right?

10:15:59 4 A. Yes. Their analysis is the skill
10:16:02 5 that they are tendering to the marketplace. What
10:16:05 6 they learn and the skills they have to evaluate.

10:16:07 7 Q. And so --

10:16:10 8 MR. KIRSCH: Tom, will you give me
10:16:12 9 ten seconds. We don't need to go off the
10:16:14 10 record.

10:16:14 11 MR. BEDNAR: Okay.

10:16:26 12 MR. KIRSCH: Thank you.

10:16:27 13 MR. BEDNAR: Sure.

10:16:28 14 BY MR. BEDNAR:

10:16:29 15 Q. Doctor, one of the things that
10:16:32 16 equity analysts may do is to render an opinion on
10:16:37 17 where they think their opinion of a company's
10:16:41 18 prospects may differ from the sentiment held by
10:16:47 19 the market as a whole. Right?

10:16:48 20 A. Yes. But, just a way of restating
10:16:52 21 the general recommendation.

10:17:02 22 Q. So, the opinion of one analyst may
10:17:04 23 not be representative of what the market as a
10:17:06 24 whole is thinking, right?

10:17:08 25 Or let me phrase that a different

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10:17:09 1 way. The opinion of one analyst may or may not
10:17:12 2 be indicative of the opinion of other analysts,
10:17:15 3 right?

10:17:16 4 A. If I can unpack that question, we
10:17:20 5 know from academic perspective, Alon Brav and
10:17:25 6 others, that analysts can sense price targets
10:17:27 7 move the market.

10:17:28 8 But then your question is what about
10:17:30 9 each individual analyst. Of course, each analyst
10:17:34 10 isn't necessarily the same which is why studies
10:17:37 11 often aggregate.

10:17:37 12 But of course each analyst is
10:17:40 13 entitled to his or her own opinion.

10:17:42 14 Q. You referred to some academic
10:17:44 15 research. Who were the authors of the research?

10:17:46 16 A. Alon Brav, and I believe the surname
10:17:50 17 of the coauthor is Lehavy, L-E-H-A-V-Y.

10:18:04 18 Q. And, is there such a thing as --

10:18:11 19 Is it possible to ascertain
10:18:15 20 consensus of what equity analysts' opinions are?

10:18:18 21 A. The answer to the question is yes.

10:18:20 22 Q. How do you do that?

10:18:22 23 A. Well, it is generally -- if you pick
10:18:26 24 a metric, it is generally done as a mean or
10:18:29 25 median of the analyst.

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10:18:31 1 Q. Mean or median of what?

10:18:34 2 A. It depends on the metric. If it is
10:18:37 3 not a quantitative metric, it is hard to say
10:18:40 4 there is a consensus around words.

10:18:42 5 But, things like an EPS target or
10:18:45 6 price target, one can drive a consensus.

10:18:47 7 Q. Okay.

10:18:48 8 A. EPS meaning earnings per share.

10:18:53 9 Q. Sure, sure. And so you often see,
10:18:55 10 you know, these information service providers
10:18:58 11 that you have referred to publishing sort of a
10:19:01 12 consensus earnings estimate of all of the
10:19:03 13 analysts that are putting out their -- right?

10:19:08 14 A. Yes. And they often will publish
10:19:11 15 the information, too, but they certainly give you
10:19:15 16 the consensus.

10:19:16 17 Q. Is there anybody that publish the
10:19:18 18 consensus of qualitative , things that aren't
10:19:22 19 quantifiable?

10:19:23 20 A. I'm sure there are. I'm not really
10:19:26 21 sure what the word consensus means in that
10:19:29 22 context, but I'm sure there must be services that
10:19:31 23 attempt to do that.

10:19:32 24 And of course, reporters do that.
10:19:34 25 It means to write a story, you are looking at a

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10:19:36 1 variety of sources, which is harder to do than a
10:19:39 2 quantitative metric.

10:19:40 3 Q. Sure. I would like to talk to you
10:19:49 4 for a few minutes about Riversdale.

10:19:53 5 So, in the work that you did in
10:19:56 6 developing your report, did you develop a sense
10:19:59 7 of why Rio Tinto acquired Riversdale in 2011?

10:20:04 8 MR. KIRSCH: Objection, vague.

10:20:07 9 THE WITNESS: My understanding,
10:20:08 10 which of course is reported in the report,
10:20:12 11 that it was a couple of things. One, a key
10:20:16 12 diversifying acquisition. And the other was
10:20:20 13 the potential prospects that the company
10:20:23 14 viewed for this particular coal project.

10:20:29 15 BY MR. BEDNAR:

10:20:29 16 Q. Let's take those one at a time.

10:20:31 17 You said that you referred to it as
10:20:33 18 a key diversifying acquisition.

10:20:35 19 What do you mean by that?

10:20:36 20 A. I think of course it is the
10:20:38 21 management, I think that is what they said. I
10:20:40 22 think that was their view of wanting to increase
10:20:44 23 their presence there.

10:20:44 24 In Rio Tinto, as a whole at that
10:20:46 25 time and probably still, iron ore is almost all

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10:20:51 1 of the earth. It is 85 percent, and still a big
10:20:55 2 chunk of the revenue.

10:20:56 3 And I think the attempt was to offer
10:20:58 4 some diversification in what they call their
10:21:01 5 energy unit, RTE, which would have included
10:21:04 6 projects like that.

10:21:07 7 Q. And then you also referred to the
10:21:09 8 potential prospects that the company used for
10:21:11 9 this particular coal project.

10:21:13 10 What did you mean by that?

10:21:14 11 A. Well, the, I believe the information
10:21:17 12 I cite was just a view at the time that this was
10:21:21 13 a promising project for coal.

10:21:35 14 Q. And it was the project that had yet
10:21:38 15 to be developed. Right?

10:21:40 16 A. Yes. In several layers. There were
10:21:44 17 questions about developing the mines themselves,
10:21:48 18 but also issues about infrastructure that would
10:21:51 19 support the movement of coal and equipment.

10:21:56 20 Q. And those things have to come
10:21:58 21 together to unlock the real value of that
10:22:01 22 project. Right?

10:22:03 23 A. That is true. Investments can --

10:22:05 24 MR. KIRSCH: Objection.

10:22:06 25 THE WITNESS: Sorry.

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10:22:07 1 MR. KIRSCH: No, please.

10:22:09 2 THE WITNESS: Investments in things
10:22:11 3 like energy, minerals are very long lived
10:22:16 4 project. And so it is often understood that
10:22:19 5 there is a great deal of capital expenditure.
10:22:23 6 A lot of assumptions about infrastructure,
10:22:25 7 about future commodity prices, about future
10:22:29 8 levels of GDP and so on.

10:22:30 9 BY MR. BEDNAR:

10:22:31 10 Q. In your research for the report, did
10:22:33 11 you come across information as to whether
10:22:35 12 Riversdale had the resources to develop that
10:22:38 13 project to its full scale?

10:22:43 14 A. I'm sorry. I don't understand the
10:22:45 15 question. So, was the question that Riversdale,
10:22:47 16 pre-Rio Tinto, had the resources to do what? I
10:22:51 17 mean, I -- I can --

10:22:53 18 Q. I think that that is a fair question
10:22:55 19 to my question.

10:22:56 20 Did you come across information as
10:22:58 21 to whether Riversdale, before it was acquired by
10:23:00 22 Rio Tinto, had the financial resources to develop
10:23:06 23 those projects?

10:23:10 24 A. It is a hard question to answer
10:23:12 25 because I don't know what you mean develop those

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10:23:14 1 projects.

10:23:14 2 To develop them at the scale Rio
10:23:16 3 Tinto had in mind, I'm going really from memory.
10:23:20 4 Because, it is not that much of my report on
10:23:23 5 this.

10:23:23 6 I would doubt that it would have.
10:23:25 7 But they may have been able to develop it for
10:23:27 8 some other purpose.

10:23:28 9 Q. Okay. And, did you come across any
10:23:31 10 information as to whether prior to the Rio Tinto
10:23:35 11 acquisition, Riversdale had experience developing
10:23:39 12 the kind of large-scale infrastructure to develop
10:23:42 13 those projects on the scale that Rio Tinto
10:23:44 14 envisioned?

10:23:46 15 A. I don't recall that, sorry.

10:23:50 16 Q. And in any event, Riversdale, as of
10:23:58 17 the time of the acquisition, had not yet done
10:24:01 18 that infrastructure development. Correct?

10:24:04 19 A. I'm not quite sure what you mean by
10:24:06 20 infrastructure.

10:24:07 21 Some of that infrastructure is
10:24:09 22 probably public sector infrastructure, not just
10:24:12 23 the company. But the infrastructure had not yet
10:24:14 24 been developed, if that is your question.

10:24:16 25 Q. Yes. And then going back to one of

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10:24:18 1 the other points that you raised had to do with
10:24:22 2 diversification.

10:24:22 3 And so I think you mentioned that
10:24:25 4 both in 2011 and today, iron ore makes up the
10:24:31 5 overwhelming majority of earnings for Rio Tinto,
10:24:34 6 right?

10:24:34 7 A. That is my understanding, yes.

10:24:36 8 Q. And, so, you saw information in
10:24:39 9 developing your report that Rio Tinto had an
10:24:42 10 interest in diversifying into other commodities,
10:24:45 11 right, in 2011?

10:24:47 12 A. I believe so. I believe that
10:24:50 13 management expressed that view, yes.

10:24:52 14 Q. And, did you see anything indicating
10:24:59 15 that Rio Tinto was primarily focused on iron ore
10:25:04 16 operation in Australia, right?

10:25:08 17 A. You mean as a component of its
10:25:10 18 revenue and earnings, is that the question?

10:25:12 19 Q. That's right.

10:25:12 20 A. The focus, yes.

10:25:14 21 Q. And so, the Riversdale acquisition
10:25:17 22 offered an opportunity to diversify somewhat out
10:25:22 23 of Australia, right?

10:25:24 24 A. It would because, yes, the project
10:25:27 25 is in Africa.

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10:25:28 1 Q. And, in fact, up until 2011, most of
10:25:32 2 Rio Tinto's projects had been in so-called
10:25:35 3 developing countries in the OECD, right?

10:25:40 4 I'm sorry. Did I say developing
10:25:43 5 countries? I certainly meant developed countries
10:25:46 6 in the OECD.

10:25:47 7 A. I was about to answer the other.
10:25:50 8 But, yes, that is true. That is my
10:25:52 9 understanding.

10:25:52 10 Q. And, so Mozambique also represented
10:25:56 11 an ability to diversify not just out of
10:25:59 12 Australia, but outside of the developed
10:26:02 13 economies, right?

10:26:05 14 A. That statement is true. The matter
10:26:08 15 of geography, if that is what you are asking.

10:26:11 16 Q. Yes. And, in 2011, with so much of
10:26:25 17 its operation concentrated in Australia, Rio
10:26:28 18 Tinto was subjected to the Australian tax regime
10:26:36 19 for mineral properties, right?

10:26:38 20 MR. KIRSCH: Objection.

10:26:39 21 THE WITNESS: Well, it will be the
10:26:42 22 subject of Australian regulation tax, any
10:26:44 23 legal requirements for a corporation.

10:26:46 24 BY MR. BEDNAR:

10:26:46 25 Q. Okay. And so, again, diversifying

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10:26:49 1 into other geographies, particularly lower tax
10:26:53 2 jurisdictions, may have provided some benefits
10:26:55 3 for Rio Tinto, correct?

10:26:57 4 A. I'm sorry. By benefits, do you mean
10:26:59 5 tax benefits? Because that is the question you
10:27:01 6 just asked.

10:27:01 7 Or do you mean something else?

10:27:03 8 Q. That's correct, tax benefits.

10:27:05 9 A. I don't know. It has been a long
10:27:08 10 time since I have looked at the Australian tax
10:27:12 11 system. I am not sure.

10:27:15 12 For that to have been true, you must
10:27:17 13 be making some kind of argument about territorial
10:27:20 14 taxations.

10:27:20 15 I'm not sure. I would have to go
10:27:22 16 back and look at the Australian system. I don't
10:27:25 17 know enough to answer the question.

10:27:26 18 Q. When you were preparing your report,
10:27:28 19 did you consider at all the mineral resources
10:27:32 20 rent tax that was placed in Australia as of
10:27:35 21 mid-2011?

10:27:38 22 A. I don't recall one way or the other.
10:27:40 23 I'm not quite sure why it would. But, I don't
10:27:42 24 recall one way or the other.

10:27:43 25 Q. Okay. And do you recall considering

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10:27:46 1 any market sentiments with whether Rio Tinto
10:27:52 2 should decrease exposure to that Australian tax
10:27:57 3 regime?

10:27:58 4 A. I'm sorry. Did you say whether it
10:28:00 5 should increase its exposure to that tax regime?

10:28:04 6 Q. Decrease.

10:28:04 7 A. Decrease. I don't recall. I don't
10:28:08 8 recall the tax discussion. It may be in some of
10:28:10 9 what I looked at, but I just don't recall.

10:28:12 10 Q. Riversdale was Rio Tinto's largest
10:28:18 11 acquisition in 2011, right?

10:28:22 12 A. In that year, yes. I think it was
10:28:24 13 about a fifth of their spending that year. Yes.

10:28:31 14 Q. And Riversdale was Rio Tinto's
10:28:32 15 largest acquisition since the 2007 Alcan
10:28:37 16 acquisition, right?

10:28:38 17 A. That is my understanding, yes.

10:28:39 18 Q. And in developing your report, did
10:28:41 19 you come across any coverage of market sentiment
10:28:44 20 related to that Alcan acquisition?

10:28:49 21 A. At the time the Alcan acquisition
10:28:51 22 was actually made? Is that your question?

10:28:53 23 Q. That is a good question. As of the
10:28:54 24 time of the Riversdale acquisition, did you come
10:28:57 25 across any coverage that would give you a sense

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10:28:59 1 of market sentiment with respect to the Alcan
10:29:01 2 acquisition?

10:29:02 3 MR. KIRSCH: Objection.

10:29:03 4 THE WITNESS: Sorry. Yes. Some of
10:29:07 5 the -- sorry. Did you want --

10:29:09 6 MR. KIRSCH: No, you can answer.

10:29:10 7 And, Tom, I will just note we have
10:29:12 8 been going about an hour. Why don't we take
10:29:14 9 a break after this.

10:29:16 10 Glenn, go ahead and answer the
10:29:17 11 question.

10:29:17 12 THE WITNESS: I'm sorry. Could you
10:29:20 13 repeat the question? Sorry. Mark distracted
10:29:24 14 me. My apologies.

10:29:24 15 BY MR. BEDNAR:

10:29:24 16 Q. Sure. I had clarified that as of
10:29:28 17 the time of the Riversdale acquisition, did you
10:29:32 18 come across any coverage that would give you a
10:29:35 19 sense of market sentiment with respect to that
10:29:39 20 Alcan acquisition?

10:29:40 21 A. Yes. If your question is at the --
10:29:44 22 for contemporary time, not the original time,
10:29:46 23 that would have been in the news, and, excuse me,
10:29:48 24 analysts' commentary that I surveyed for the
10:29:51 25 period.

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10:29:51 1 Q. And what was that sentiment if you
10:29:54 2 know?

10:29:56 3 A. My recollection is skepticism about
10:30:00 4 the asset, but again this wasn't something that I
10:30:02 5 was asked to study.

10:30:05 6 Q. Okay. Now were you aware --

10:30:07 7 MR. KIRSCH: Can we take that break,
10:30:09 8 Tom?

10:30:09 9 THE WITNESS: We can finish -- I'm
10:30:11 10 happy, if this is a line of questioning, I'm
10:30:13 11 happy to finish it.

10:30:14 12 MR. BEDNAR: It is fine with me to
10:30:15 13 take a short break and we can just pick up.
10:30:17 14 It is easy enough. We can go off the record.

10:30:19 15 THE VIDEOGRAPHER: We are going off
10:30:22 16 the record. The time is 10:30 eastern.

10:30:26 17 (Recess taken -- 10:30 a.m.)

10:43:51 18 (After recess -- 10:44 a.m.)

10:43:51 19 THE VIDEOGRAPHER: We are going back
10:44:21 20 on the record. The time is 10:44 eastern.

10:44:27 21 BY MR. BEDNAR:

10:44:30 22 Q. Dr. Hubbard, we were -- I asked you
10:44:32 23 a couple of questions about the Alcan
10:44:35 24 acquisition. I have just a couple more. I
10:44:37 25 understand that you did not cover the

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10:44:41 1 acquisition.

10:44:41 2 But in the work you did for your
10:44:43 3 report, were you aware that as of 2011, when
10:44:47 4 Riversdale was acquired, there had been several
10:44:50 5 impairments to the value of Alcan?

10:44:55 6 A. I believe that is true. Again, it
10:44:58 7 is not the subject of my report. So, I believe
10:45:02 8 that is true, but I'm of course not a fact
10:45:04 9 witness. That is not the subject I was tasked to
10:45:07 10 consider.

10:45:08 11 Q. Doctor, if I could again show you
10:45:49 12 Exhibit 1101, which is the materials considered.

10:45:54 13 I can put it up on the screen for
10:45:56 14 you.

10:46:02 15 A. Okay.

10:46:11 16 Q. On the third page of the appendix,
10:46:14 17 and then carrying on for several pages
10:46:16 18 thereafter, are news reports from Factiva.

10:46:20 19 A. Yes.

10:46:20 20 Q. And the first items, 188 through
10:46:36 21 194, are dated March 28, 2011, correct?

10:46:40 22 A. That is true, yes.

10:46:42 23 Q. The remaining items, if you scroll
10:46:45 24 down from Page 3 onward -- the remaining medias
10:46:50 25 goes from March 28th forward. Is that correct?

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10:46:54 1 A. Yes, sir.

10:46:56 2 Q. Did you analyze news before
10:47:03 3 March 28th other than the few items that are
10:47:06 4 listed on that appendix?

10:47:08 5 A. If the those are the items I listed,
10:47:11 6 those would have been the ones that met the
10:47:14 7 keyword search.

10:47:16 8 So, I believe I am faithful in
10:47:20 9 putting in all of the articles that I reviewed.

10:47:22 10 Q. Do you have any opinions about
10:47:27 11 events related to Rio Tinto's Riversdale bid
10:47:31 12 prior to March 28th, or 29th, 2011?

10:47:36 13 A. If I am understanding your question,
10:47:41 14 I think I made the point earlier, nothing in this
10:47:43 15 case has anything to do with that, from an
10:47:45 16 economic perspective.

10:47:46 17 So, no, I wouldn't bother to have an
10:47:51 18 opinion.

10:47:57 19 Q. And other than maybe captured by the
10:48:01 20 few articles that you cited that predate
10:48:05 21 March 28th, did you do anything to analyze Rio
10:48:07 22 Tinto's bid for Riversdale prior to that date?

10:48:11 23 A. I'm not even sure what that question
10:48:14 24 means. It might mean a price. It might mean a
10:48:18 25 process. It might mean lots of things. As I

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10:48:18 1 told you, it is not an economically interesting
10:48:18 2 question. I didn't do it.

10:48:22 3 But, for the record, I want to be
10:48:23 4 clear, I don't know what you are asking.

10:48:26 5 Q. I am simply asking in forming your
10:48:29 6 rebuttal to Dr. Metz, in which you evaluate Rio
10:48:33 7 Tinto's bid for Riversdale, whether or not you
10:48:36 8 think that is an important question, do you agree
10:48:38 9 that you provide an analysis of that question in
10:48:41 10 your rebuttal, to respond to Dr. Metz. Right?

10:48:44 11 MR. KIRSCH: Objection. What
10:48:45 12 question?

10:48:48 13 THE WITNESS: You keep saying bid.
10:48:49 14 I don't know if you are referring to dollars,
10:48:51 15 if you are referring to a process.

10:48:53 16 Again, I don't think this is
10:48:55 17 interesting, but you tell me what you want
10:48:57 18 and I will answer.

10:48:59 19 BY MR. BEDNAR:

10:48:59 20 Q. Okay. Sure. You provided analysis
10:49:01 21 in response to Dr. Metz of Rio Tinto's
10:49:04 22 acquisition of Riversdale, right?

10:49:08 23 A. That is not quite the way I would
10:49:11 24 put it. But, I certainly evaluated Dr. Metz's
10:49:15 25 statistical work. I don't think any of that has

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10:49:18 1 any economic content.

10:49:20 2 Now you are asking me some factual
10:49:22 3 questions about a bid, but you are not willing to
10:49:24 4 tell me what you mean by that. Say a number, a
10:49:26 5 process.

10:49:27 6 Q. Sure. Doctor, you provided
10:49:29 7 information about the state of Rio Tinto's offer
10:49:32 8 as of March 29th, 2011. Correct?

10:49:36 9 A. Yes.

10:49:37 10 Q. And, on that day, Rio Tinto removed
10:49:42 11 the minimum acceptance position, correct?

10:49:49 12 A. Yes.

10:49:49 13 Q. It was from lowered from 50 percent
10:49:56 14 to 47 percent, right?

10:49:58 15 A. That is my understanding.

10:49:59 16 Q. And so, that is an aspect of Rio
10:50:01 17 Tinto's offer you did analyze in preparing your
10:50:10 18 expert report. Right?

10:50:13 19 A. Yes, I believe I commented on
10:50:15 20 Dr. Metz's backup materials and his looking at
10:50:19 21 days, I believe including that one, and their
10:50:21 22 lack of statistical significance, yes.

10:50:23 23 Q. And you did not comment on any
10:50:26 24 aspects of Rio Tinto's offer prior to March 28th.
10:50:35 25 Correct?

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10:50:35 1 A. If I am understanding your question
10:50:37 2 other than that there is an offer, I'm not sure
10:50:39 3 why I would. I have already told you it is not
10:50:42 4 an economic question before the court.

10:50:45 5 And, second, what Dr. Metz had was
10:50:48 6 an argument about control, which is an argument
10:50:51 7 about those last several days. That is where he
10:50:53 8 and I have a disagreement.

10:50:54 9 I hope that is helpful but I'm not
10:50:57 10 sure exactly what you are asking.

10:50:58 11 Q. Sure. So, is it your conclusion
10:51:00 12 that events prior to March 28th and March 29th of
10:51:02 13 2011 are not relevant to the question of control?

10:51:07 14 A. Now you are asking a different
10:51:10 15 question.

10:51:10 16 What I said earlier was they are not
10:51:12 17 relevant to the question before the court, from
10:51:15 18 an economic perspective, which is ultimately
10:51:18 19 about the impairments. It is not relevant at all
10:51:20 20 to that.

10:51:20 21 On control, I would also disagree
10:51:23 22 because the question is where are you getting
10:51:28 23 news about control. Dr. Metz talks about several
10:51:31 24 events in that late March, early April period,
10:51:34 25 but his own backup materials find no

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10:51:37 1 statistically significant event.

10:51:40 2 Q. Did you analyze any event with
10:51:46 3 respect to the Riversdale acquisition prior to
10:51:49 4 March 28th of 2011?

10:51:52 5 A. I don't even know what that means.
10:51:54 6 I reported the news events. I wouldn't have
10:51:58 7 analyzed it.

10:51:59 8 All I'm doing here is responding to
10:52:02 9 Dr. Metz. I don't think this is a live question
10:52:08 10 at least from an economic perspective.

10:52:10 11 And if it is your view that control
10:52:12 12 was established earlier, then I think your
10:52:18 13 position's intention would rest.

10:52:22 14 Q. Do you have an opinion as to when
10:52:24 15 control was established?

10:52:28 16 A. I think that is -- from an economic
10:52:30 17 perspective, that is a hard question to -- the
10:52:34 18 statistics, you are trying to get at when the
10:52:36 19 market believed that control would occur.

10:52:39 20 So, it is not the mere fact. The
10:52:41 21 price reaction would be to the belief that it
10:52:46 22 would happen. That is really the economic test.

10:52:48 23 Dr. Metz asserts that on April 8th
10:52:51 24 that was the news that met the market. You know,
10:52:54 25 I have already said it is not an interesting

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10:52:56 1 question. It is the wrong statistics.

10:52:58 2 And, by the way, his point estimate
10:53:00 3 would lead to a nonsensical application.

10:53:03 4 Q. So, do you have an opinion as to
10:53:05 5 when the market concluded that Rio Tinto would
10:53:07 6 gain control?

10:53:09 7 A. I believe what I say in the report
10:53:11 8 is it became evident over time from analysts.
10:53:15 9 And those were the gradual understanding that
10:53:17 10 that is the case. As Dr. Metz notes in his own
10:53:20 11 backup, he doesn't find any statistically
10:53:22 12 significant effects on those run-up days prior to
10:53:26 13 April 8th.

10:53:31 14 Q. And you are saying that the market
10:53:42 15 developed an understanding over time when Rio
10:53:47 16 Tinto would gain control?

10:53:49 17 A. It would be an expectation, I
10:53:52 18 suppose is the better way to put it.

10:53:53 19 And I'm not sure why one would care
10:54:00 20 about the answer to that question, but -- in this
10:54:02 21 context. But, that is the view that I think
10:54:04 22 analysts express, and that Dr. Metz's statistics
10:54:07 23 seem to imply.

10:54:09 24 Q. Over what period of time did the
10:54:11 25 market come to that understanding or expectation

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10:54:16 1 that Rio Tinto gained control?

10:54:21 2 A. Well, the news reports and analyst
10:54:24 3 reports that I suggest have increasing commentary
10:54:26 4 on that in late March and early April.

10:54:30 5 Again, I'm not sure why this is
10:54:37 6 important.

10:54:38 7 What Dr. Metz measures, he calls
10:54:41 8 control, but I'm not even sure what it is or why
10:54:44 9 it would matter.

10:54:54 10 Q. Was March 29, 2011, significant in
10:55:01 11 your analysis of the news related to Rio Tinto's
10:55:04 12 attempt to acquire Riversdale?

10:55:07 13 MR. KIRSCH: Objection, vague.

10:55:09 14 THE WITNESS: Yeah, I'm not sure
10:55:10 15 what you mean by significant. Again, this
10:55:14 16 prior exercise is not worth doing. That is
10:55:16 17 my opinion.

10:55:17 18 I believe on March 29th, the bid was
10:55:19 19 made unconditional. Is that what you are
10:55:21 20 referring to? So, that is certainly a step
10:55:23 21 along the way, if that is your question and
10:55:29 22 actual answer.

10:55:30 23 BY MR. BEDNAR:

10:55:31 24 Q. Yes. Was there any other change
10:55:33 25 made to Rio Tinto's offer on March 29th in making

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10:55:37 1 the bid unconditional?

10:55:39 2 A. I don't remember. At some point
10:55:40 3 they increased the price modestly, but I don't
10:55:43 4 really remember which day that was.

10:55:45 5 Q. That could have been before
10:55:46 6 March 29th?

10:55:47 7 A. I don't really recall.

10:55:50 8 Q. And on March 29th, did Rio Tinto put
10:56:00 9 the deadline for its offer at April 6th; is that
10:56:04 10 correct?

10:56:06 11 A. That is my recollection, yes.

10:56:11 12 Q. And then that deadline was later
10:56:14 13 extended?

10:56:16 14 A. That is correct, too.

10:56:19 15 Q. Did you analyze Rio Tinto's ADR
10:56:22 16 price on March 29th, 2011?

10:56:28 17 A. It is not in my report. If it was
10:56:31 18 one of the dates that was in Dr. Metz's backup,
10:56:34 19 then I would have reviewed his backup and
10:56:37 20 commented on it.

10:56:38 21 But, I don't remember if that is one
10:56:39 22 of his dates.

10:56:42 23 If it is, I did look at it because
10:56:44 24 he looked at it, and it was statistically
10:56:47 25 significant. I just don't remember if that is

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10:56:50 1 one of the dates. It is in the report.

10:56:52 2 Q. Did you test March 29th, 2011, using
10:56:56 3 either of your administrative dates?

10:57:04 4 MR. KIRSCH: Objection.

10:57:06 5 THE WITNESS: If I am understanding
10:57:07 6 your question --

10:57:08 7 Sorry.

10:57:08 8 MR. KIRSCH: I was just going to
10:57:08 9 say, Tom, when you say testing the date, can
10:57:10 10 you tell us what you mean?

10:57:12 11 MR. BEDNAR: Sure.

10:57:12 12 BY MR. BEDNAR:

10:57:12 13 Q. Did you test returns on Rio Tinto's
10:57:18 14 ADR project on March 29th, 2011, using either the
10:57:24 15 HSBC Mining Index or the eight company competitor
10:57:29 16 index?

10:57:29 17 THE WITNESS: I don't recall, but I
10:57:30 18 doubt it, because again I think the whole
10:57:32 19 question is sterile. The only point of my
10:57:32 20 comment was that Dr. Metz heat up an
10:57:37 21 argument. So, let's use his own backup and
10:57:40 22 see what he found. So, no, I don't think any
10:57:42 23 index.

10:57:42 24 BY MR. BEDNAR:

10:57:43 25 Q. So, would you be surprised to learn

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10:57:44 1 that in the backup material produced with your
10:57:47 2 report, that you or someone on your team did test
10:57:52 3 the ADR returns on March 29th, 2011, using the
10:57:58 4 HSBC Mining Index?

10:58:01 5 A. As I say, I don't recall one way or
10:58:02 6 the other. I don't think it is a very
10:58:03 7 interesting thing to do, but if it is in the
10:58:05 8 production, have at it.

10:58:07 9 Q. So, if that were done, was that
10:58:10 10 under your direction or did someone do that on
10:58:12 11 their own?

10:58:13 12 A. I probably asked to produce as
10:58:17 13 ultimate backup for you as possible, even though
10:58:19 14 I don't think any of this is interesting from a
10:58:21 15 matter of economics.

10:58:22 16 I was just trying to be a
10:58:24 17 counterpoint to Dr. Metz.

10:58:26 18 Q. Right. I'm not asking about why it
10:58:28 19 was produced. I'm asking about why it was done.

10:58:30 20 Did you direct someone to test ADR
10:58:35 21 returns on March 21, 2011, using the HSBC Mining
10:58:39 22 Index?

10:58:39 23 A. I don't recall seeing something like
10:58:41 24 that. It may have been part of the general
10:58:42 25 instruction and that is what is produced.

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10:58:43 1 Again, I don't think it is an answer
10:58:45 2 to any question that I care.

10:58:50 3 Q. And so you wouldn't care that the
10:58:52 4 results from that analysis that was produced in
10:58:56 5 your backup materials was a key statistic of 1.91
10:59:00 6 with a T value of 5.6 percent?

10:59:06 7 A. No.

10:59:06 8 MR. KIRSCH: Objection.

10:59:07 9 THE WITNESS: No. Again, it is not
10:59:08 10 an answer to any question I'm aware of in
10:59:11 11 Econ 101. It doesn't sound like it is
10:59:14 12 statistically significant in any event.

10:59:16 13 But it is not an interesting
10:59:18 14 exercise to do.

10:59:19 15 BY MR. BEDNAR:

10:59:19 16 Q. Well, that would be statistically
10:59:21 17 significant if it was, correct?

10:59:24 18 A. There is always a level at which
10:59:26 19 something is significant. I believe that
10:59:28 20 Dr. Metz suggests a 95 percent threshold.

10:59:31 21 But, statistics aren't the key
10:59:33 22 answer here. The key answer is this is not worth
10:59:36 23 doing.

10:59:37 24 Q. But yes or no, the key statistic of
10:59:40 25 1.91 which is a P value of 5.6 percent would be

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10:59:44 1 statistically significant at the 10 percent
10:59:46 2 level?

10:59:46 3 A. Yes, it is just not the answer to
10:59:48 4 any economic question, but a statistic question.

10:59:52 5 Q. And a key statistic of 1.91 with a
10:59:55 6 key value of 5.6 percent, that would be close to
10:59:59 7 a 2 statistical significance at the 5 percent
11:00:02 8 level, correct?

11:00:03 9 A. Close is in the mind of the
11:00:06 10 beholder. It is certainly, you know, within a
11:00:08 11 few percentage points. Again, I'm not sure why
11:00:11 12 you would care one way or the other.

11:00:13 13 Q. And I -- so, do you know that
11:00:21 14 regression analysis in your backup materials and
11:00:25 15 you used it to index.

11:00:27 16 Do you know one way or the other
11:00:29 17 whether that was wrong to be including or
11:00:31 18 excluding the running announcement date?

11:00:34 19 MR. KIRSCH: Objection. Vague.

11:00:35 20 THE WITNESS: If I am understanding
11:00:38 21 your question, I have to go back and look.
11:00:40 22 But, I don't think it excluded the earnings
11:00:45 23 announcement dates.

11:00:47 24 But if this is -- again, I didn't
11:00:49 25 spend much time on this because I don't think

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11:00:52 1 it is important. But, I can go back and look
11:00:53 2 if that is important to you.

11:00:54 3 BY MR. BEDNAR:

11:00:55 4 Q. No, I'm specifically referring --
11:00:56 5 and I should have clarified. I just said a
11:00:58 6 regression analysis.

11:00:59 7 I'm talking about the regression
11:01:01 8 analysis of March 29, 2011 in your appendix, that
11:01:03 9 was produced in the backup.

11:01:04 10 Are you in a position to know
11:01:06 11 whether or not earnings announcement dates were
11:01:08 12 excluded or not?

11:01:09 13 A. I don't believe we did.

11:01:11 14 But, again, if it is important, we
11:01:13 15 could go back and check.

11:01:15 16 Q. And then, would it surprise you to
11:01:32 17 know that if that regression that someone in your
11:01:33 18 team ran from March 29th -- before
11:01:37 19 March 29, 2011, ADR price, using the HSBC Mining
11:01:41 20 Index, if earnings announcement dates were
11:01:45 21 excluded, and if returns are measured in
11:01:47 22 percentages rather than logs, the result would be
11:01:52 23 1.96.

11:01:56 24 Does that surprise you?

11:01:56 25 MR. KIRSCH: Objection.

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11:01:57 1 THE WITNESS: I don't know either
11:01:59 2 way. That sounds like if you used partly
11:02:02 3 what I did and partly the way Dr. Metz did,
11:02:05 4 can he torture something to get to some
11:02:09 5 number? I don't know. It doesn't matter
11:02:11 6 because none of it is worth doing. I don't
11:02:14 7 know one way or the other.

11:02:14 8 BY MR. BEDNAR:

11:02:15 9 Q. Well, at least for purposes of
11:02:16 10 preparing your report, someone on your team ran
11:02:19 11 the regression. Right?

11:02:22 12 MR. KIRSCH: Objection.

11:02:22 13 BY MR. BEDNAR:

11:02:23 14 Q. At least in the backup materials?

11:02:25 15 A. My recollection is we did it because
11:02:27 16 again we were responding to Dr. Metz's claim.

11:02:29 17 And using Dr. Metz's own data, which
11:02:32 18 I assume is the way Dr. Metz sees the world,
11:02:35 19 there is no statistical significance.

11:02:37 20 We may have also provided my model.
11:02:40 21 But, again, I don't think this is the answer of
11:02:42 22 any question of which I'm aware.

11:02:49 23 Q. In preparing your report did you
11:03:02 24 look into ADR prices for industry before
11:03:06 25 March 29, 2011?

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11:03:08 1 A. I'm sorry, I don't know what you
11:03:12 2 mean by look at.

11:03:13 3 I mean the market model goes back
11:03:16 4 120 days.

11:03:16 5 But, I'm not looking day by day, if
11:03:19 6 that is your question.

11:03:20 7 Q. Okay. And that was my question.
11:03:23 8 Thank you for clarifying. That is a fair
11:03:24 9 clarification.

11:03:24 10 I want to talk to you about the
11:04:14 11 industry index that Dr. Metz used in his event
11:04:18 12 studies, the S&P Metals and Mining Select Index.

11:04:23 13 Now you came to the conclusion that
11:04:24 14 that was not a valid industry index for an event
11:04:27 15 study focused on the APR, correct?

11:04:31 16 A. That is correct.

11:04:32 17 Q. What features of the S&P index --

11:04:40 18 First of all, is it okay if I refer
11:04:41 19 to that as the S&P index for the purposes of this
11:04:45 20 discussion?

11:04:45 21 A. Sure.

11:04:46 22 Q. If we need to change and talk about
11:04:49 23 some other S&P index, we can classify that.

11:04:52 24 What features of the S&P index
11:04:56 25 render it invalid for use with the Rio Tinto

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11:05:01 1 method, in your opinion?

11:05:02 2 A. It wouldn't include the large
11:05:04 3 globally diversified mining companies that both
11:05:07 4 the company and the marketplace compared Rio
11:05:09 5 Tinto to. And wouldn't have included those large
11:05:12 6 players, who are mainly non-U.S. companies.

11:05:15 7 It included a lot of firms in
11:05:18 8 industries unrelated to the core of what Rio
11:05:23 9 Tinto does. I have provided an exhibit in the
11:05:25 10 report to illustrate that.

11:05:28 11 Q. And so, you referred to the name,
11:05:46 12 globally diversified mining companies, that
11:05:50 13 include a large globally diversified mining
11:05:54 14 companies.

11:05:54 15 Specifically which ones do you have
11:05:56 16 in mind?

11:05:56 17 A. Well, the ones that would be at the
11:05:59 18 top of the HSBC, like Vale, BHP and others that
11:06:06 19 aren't U.S. companies, would not be in the S&P
11:06:09 20 Mining Index.

11:06:10 21 Yet those were the comparators that
11:06:12 22 the firm itself, Rio Tinto, used.

11:06:16 23 Q. Could there be a valid industry
11:06:32 24 index for an event study focused on Rio Tinto, if
11:06:35 25 it did not include Vale and BHP?

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11:06:41 1 A. Well, if the purpose is capturing
11:06:43 2 the industry in which Rio Tinto is occupying, you
11:06:47 3 would want to have its true comparators which
11:06:49 4 would be those firms.

11:06:51 5 They are not present in the S&P
11:06:53 6 Mining Index. And other firms are that are in
11:06:58 7 the industry that aren't as related to Rio Tinto.

11:06:59 8 The goal of an industry index, from
11:07:02 9 an academic perspective would be as close to the
11:07:06 10 true industry comparators to your firm.

11:07:19 11 Q. So, would it be possible to have an
11:07:21 12 index that would be valid for an event study
11:07:25 13 focused on Rio Tinto if it did not have Vale and
11:07:28 14 BHP?

11:07:30 15 A. I don't know what you mean by valid.
11:07:33 16 If you are trying to capture the actual
11:07:36 17 comparators, I would think you would want the
11:07:38 18 actual comparators of the firm.

11:07:39 19 You can use alternative industry
11:07:44 20 indexes and people can fight over them. I just
11:07:47 21 don't think the one he used is the best one.

11:07:50 22 Again, the answer he gets is
11:07:52 23 irrelevant anyway. In my view, it doesn't
11:07:55 24 matter.

11:07:55 25 But if you are asking me is there a

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11:07:57 1 better index. There absolutely is. I used it to
11:08:17 2 get it.

11:08:17 3 Q. You said that the S&P Index included
11:08:22 4 companies in the industry unrelated to the core
11:08:24 5 of Rio Tinto's operations.

11:08:25 6 What do you mean by that?

11:08:27 7 A. Well, it is described in the report,
11:08:30 8 as, going from memory, and steel companies, other
11:08:34 9 companies not directly in the mining business.

11:08:36 10 There is an exhibit early on that I
11:08:39 11 have. Let me see if I can find it. I think may
11:08:42 12 be the best way to illustrate it.

11:08:43 13 Exhibit 4 in the report. This is in
11:08:49 14 the back. So this would look at the composition
11:08:52 15 of the S&P Index, as you refer to it, that was
11:08:56 16 used by Dr. Metz, and the HSBC Index.

11:08:59 17 It also contains, you know, the, my
11:09:05 18 peer index.

11:09:05 19 And you can see that the largest
11:09:09 20 HSBC Index companies are all in the metal mining
11:09:13 21 business.

11:09:13 22 Move to the left and compare that
11:09:15 23 with SPMM, that is lots of different industries.

11:09:24 24 Q. And, Doctor, I'm going to go ahead
11:09:26 25 and put that on the screen. It is marked as

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11:09:30 1 Exhibit 1115.

11:09:30 2 (Exhibit Number 1115
11:09:30 3 marked for identification.)

11:09:32 4 THE WITNESS: Yes. That is the
11:09:33 5 exhibit to which I was referring.

11:09:35 6 BY MR. BEDNAR:

11:09:35 7 Q. Sure. And so, the middle column in
11:09:39 8 that table, where it says 100 percent, in blue,
11:09:44 9 that is 100 percent of the top ten largest
11:09:47 10 companies in the HSBC Mining Index, right?

11:09:50 11 A. That's correct.

11:09:51 12 Q. So, it is not 100 percent of the
11:09:54 13 HSBC Index, but rather the top ten companies?

11:09:57 14 A. I'm not sure. I don't know that I
11:09:59 15 have looked at the whole index or this data. The
11:10:04 16 top ten are about half of the market cap.

11:10:07 17 So, certainly a large part of the
11:10:09 18 index is in metal mining.

11:10:12 19 Q. And then in that top ten, there is
11:10:16 20 eight unique companies in the top ten of the HSBC
11:10:22 21 Index, right?

11:10:22 22 A. I'm sorry, you are breaking up.

11:10:24 23 Q. Sure. The top ten of the HSBC
11:10:27 24 Index, that is comprised of eight unique
11:10:30 25 companies, right?

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11:10:30 1 A. That is true. As explained in the
11:10:33 2 notes, yes.

11:10:33 3 Q. The different colors that are at the
11:10:37 4 top of Exhibit 1115, your Exhibit 4, the numbers
11:10:43 5 that appear next to those items such as 10 metal
11:10:47 6 mining, 33 primary metal industries. What do
11:10:52 7 those come from?

11:10:53 8 A. Those are SIC codes.

11:10:56 9 Q. And what are SIC codes?

11:10:58 10 A. SIC codes are a variety of -- this
11:11:04 11 has to do with two digit levels, measures from
11:11:07 12 what the government calls a standard industrial
11:11:10 13 classification system of industries.

11:11:12 14 So there is one digit, two digit,
11:11:14 15 three digit, four digit and so on.

11:11:22 16 Q. And for instance if the companies
11:11:25 17 have SIC Code 33 for primary metal industries,
11:11:29 18 how would you characterize companies that have
11:11:31 19 that code?

11:11:35 20 A. I don't recall off the top of my
11:11:38 21 head. There are, in the prime -- I'm not sure
11:11:42 22 which industries the SIC code puts the primary
11:11:46 23 metals. I don't really recall.

11:11:50 24 It may be in the report but I don't
11:11:51 25 recall sitting here.

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11:12:00 1 Q. For instance, if the company has a
11:12:01 2 code of 10 for metal mining, does that mean that
11:12:05 3 the company only engages in metal mining?

11:12:07 4 A. No, it would mean that it is
11:12:10 5 principally extractive metal mining.

11:12:15 6 Q. In this context what does
11:12:17 7 principally mean?

11:12:19 8 A. I don't remember what the threshold
11:12:21 9 the government uses for the SIC code.

11:12:24 10 Q. Okay. Is there any requirement in
11:12:33 11 conducting an event study when selecting an
11:12:36 12 industry index to get consideration to the SIC
11:12:44 13 codes for the company doing the index?

11:12:45 14 A. I'm sorry. You are breaking up
11:12:47 15 again. Something about a requirement and an SIC
11:12:50 16 code.

11:12:50 17 Q. Sure. Is there any requirement to
11:12:51 18 get consideration to the SIC codes of the
11:12:54 19 companies in the industry index when conducting
11:12:56 20 an event study?

11:12:58 21 A. Requirement would be too strong a
11:13:02 22 word. It would be a metric one would use when
11:13:06 23 looking at comparability. Requirement sounds
11:13:09 24 very de regist [phonetic]. That is not what I'm
11:13:13 25 saying.

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11:13:15 1 Q. Are you familiar with GITS codes,
11:13:25 2 G-I-T-S?

11:13:25 3 A. Yes, they are privately provided.
11:13:28 4 But, also are industry classifications.

11:13:32 5 Q. Do you know who provides GITS codes?

11:13:37 6 A. I think it is S&P.

11:13:40 7 Q. And do GITS codes differ from SIC
11:13:56 8 codes?

11:13:57 9 A. It has been a while since I have
11:13:58 10 looked at this. They must or S&P wouldn't be
11:14:02 11 selling them separate for something you could get
11:14:05 12 for free. I don't recall.

11:14:06 13 Q. And are you familiar with NAICS
11:14:10 14 codes, N-A-I-C-S?

11:14:11 15 A. Yes. The NAICs, over times, my
11:14:17 16 recollection is, preceded the old SIC.

11:14:23 17 Q. I'm going to take the exhibit down
11:14:34 18 just because I'm not going to refer to it right
11:14:36 19 now.

11:14:36 20 You opined that an appropriate index
11:14:48 21 would be one made up of companies producing
11:14:51 22 similar products. Correct?

11:14:53 23 A. Yes. I said similar products,
11:14:55 24 correct.

11:14:57 25 Q. How do you define similar in that

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11:14:59 1 context?

11:15:03 2 A. If I'm understanding your question,
11:15:05 3 the product would be, you know, what is being
11:15:08 4 sold. Would you compare a car company to a
11:15:12 5 software company? Not as an industry index.

11:15:16 6 There may be other reasons you would
11:15:18 7 look at the correlations, but not as an industry
11:15:21 8 index.

11:15:22 9 So, where possible, you are never
11:15:23 10 going to get it perfectly, you are trying to get
11:15:25 11 a similar product mix. As much as when you are
11:15:29 12 valuing companies and use comparable firms, you
11:15:32 13 have the same idea. You are trying to get things
11:15:34 14 that are roughly comparable to the firm at issue.

11:15:46 15 Q. So, in trying to ascertain an
11:15:51 16 appropriate industry index if one were to conduct
11:15:57 17 an event study for Rio Tinto, what products did
11:15:59 18 you look for that were similar to those sold by
11:16:06 19 Rio Tinto?

11:16:06 20 MR. KIRSCH: Tom, I apologize, I
11:16:09 21 couldn't hear you. You weren't coming
11:16:11 22 through clearly, to me at least.

11:16:14 23 BY MR. BEDNAR:

11:16:14 24 Q. For the purpose of this event
11:16:15 25 study -- excuse me.

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11:16:16 1 For the purposes of conducting the
11:16:18 2 event study for Rio Tinto, what products did you
11:16:20 3 look for that are similar to those sold by Rio
11:16:22 4 Tinto?

11:16:23 5 A. Well, again, you are --

11:16:25 6 MR. KIRSCH: Objection.

11:16:25 7 THE WITNESS: I am going to the
11:16:27 8 discussion in the report, because I think it
11:16:31 9 might be helpful.

11:16:32 10 You are trying to get as close as
11:16:34 11 possible again to the products here. So,
11:16:36 12 this would be firms that are principally in
11:16:39 13 metals, you know, mining of metals and
11:16:45 14 industry, much like the SIC 10. I am trying
11:16:48 15 to see what I said here in the reports.

11:16:51 16 BY MR. BEDNAR:

11:16:52 17 Q. What part of the report are you
11:16:53 18 referring to?

11:16:53 19 A. I am just looking at the part of the
11:16:56 20 report criticizing Dr. Metz's index.

11:17:00 21 Q. What page or paragraph?

11:17:02 22 A. Paragraph -- well, I'm just starting
11:17:07 23 to flip through 32, 33, so on. Yes, for example,
11:17:18 24 Paragraph 60. And there are some footnotes that
11:17:22 25 follow about the SIC system.

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11:17:29 1 Q. Are you at Paragraph 60, or are you
11:17:32 2 now on the next page?

11:17:34 3 A. I started at Paragraph 50, but I
11:17:37 4 don't really have anything to add to my answer.
11:17:39 5 It is all there, if you would like to see it.

11:17:41 6 But, you are trying to get as close
11:17:43 7 as possible in product space.

11:17:46 8 Q. And what I'm asking you is what
11:17:48 9 products are you trying to get as close as
11:17:50 10 possible to?

11:17:52 11 A. Well, that is what the discussion
11:17:54 12 there says. You are trying to get at global
11:17:57 13 miners which are, you know, large, largely
11:18:01 14 foreign companies and in similar industry groups.

11:18:05 15 I make the point both about the kind
11:18:07 16 of company and about the, and about the industry.

11:18:16 17 Q. At Paragraph 61, you state that Rio
11:18:21 18 Tinto's underlying earnings were derived from
11:18:26 19 mining metals, including iron, copper, gold, and
11:18:29 20 silver.

11:18:30 21 Are those the materials that you are
11:18:31 22 trying to get a similar mix to?

11:18:35 23 A. Well, you are trying to get a -- you
11:18:37 24 are never going to get exactly the same in any
11:18:39 25 comparability analysis. But you are trying to

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11:18:42 1 get, you know, other global miners like that.

11:18:44 2 So, you want similar products and
11:18:46 3 you are looking for similar product mix where
11:18:49 4 possible.

11:18:49 5 And that is what the next few
11:18:51 6 paragraphs are trying to do.

11:18:54 7 Q. Are there any other products that
11:18:56 8 you are trying to have represented in that
11:18:58 9 product mix?

11:19:01 10 A. I think it is just metals and mining
11:19:04 11 products that I mention there.

11:19:13 12 Q. So the product that you are looking
11:19:14 13 for is in the report?

11:19:17 14 A. Yes, in that section. And in the
11:19:20 15 exhibit that we have talked about earlier.

11:19:27 16 Q. Are there any products represented
11:19:34 17 in the S&P index that you view as dissimilar to
11:19:38 18 those sold by Rio Tinto?

11:19:42 19 A. I'm going from memory -- sorry.

11:19:44 20 MR. KIRSCH: Objection. You can
11:19:49 21 answer, go ahead.

11:19:51 22 THE WITNESS: I'm going from memory.
11:19:53 23 The answer is many smaller companies, the
11:19:56 24 different kind of companies and in product
11:19:58 25 space, things like steel and other products

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11:20:00 1 that are at a different stage of production.
11:20:05 2 My recollection -- it is all in the report,
11:20:07 3 but that is my recollection.

11:20:14 4 BY MR. BEDNAR:

11:20:15 5 Q. So, your view is that steel is
11:20:16 6 different from the products that Rio Tinto sells?

11:20:21 7 A. Yes, from an industry comparability
11:20:24 8 perspective, yes. That would be true.

11:20:30 9 Q. What about aluminum?

11:20:34 10 A. Well, aluminum yes. And I mean
11:20:37 11 aluminum is obviously part of the business of the
11:20:40 12 company.

11:20:42 13 So, it is not -- you know, aluminum
11:20:46 14 involves --

11:20:47 15 Most aluminum companies involve some
11:20:50 16 mining as well as refining, although it is mainly
11:20:54 17 in refining. But there is certainly some in
11:20:58 18 here.

11:20:58 19 Q. And when you say there are certainly
11:21:02 20 some in here, what do you mean?

11:21:04 21 A. Well, in other words, there are some
11:21:06 22 in these indexes, or indices that are aluminum
11:21:10 23 companies.

11:21:13 24 Q. And when you say in these indices,
11:21:17 25 are you talking about all of the indices at

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11:21:21 1 issue?

11:21:21 2 A. Certainly in S&P. I don't really
11:21:24 3 recall in HSBC, one way or the other.

11:21:26 4 Again zero percent of this is in my
11:21:30 5 report because of the April 8th issue, I should
11:21:33 6 qualify that.

11:21:34 7 Q. And with respect to the eight
11:21:36 8 company comparator index that you used for some
11:21:43 9 of your analyses, is aluminum in that index?

11:21:45 10 A. I don't remember. I would have to
11:21:48 11 look. That may well be the case.

11:21:55 12 Q. And, so you mentioned steel. Are
11:22:09 13 there any other products that it would be
11:22:21 14 problematic to include in your industry index?

11:22:23 15 A. That is what comes to mind. Again,
11:22:26 16 you are just -- the question one normally asks
11:22:29 17 oneself is what are you trying to get close to.

11:22:32 18 You are trying to get close to
11:22:34 19 globally diversified mining and metals company.

11:22:42 20 Q. Does every company in the index need
11:22:44 21 to be close to the mix in products that the
11:22:49 22 company you are studying has?

11:22:53 23 MR. KIRSCH: Objection.

11:22:54 24 THE WITNESS: Ideally --

11:22:55 25 MR. KIRSCH: For what purpose, Tom?

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11:22:58 1 MR. BEDNAR: For the purpose of
11:23:01 2 constructing a valid industry index.

11:23:04 3 MR. KIRSCH: Thank you.

11:23:05 4 THE WITNESS: You are asking a very
11:23:06 5 general question. Let me try to relate it to
11:23:10 6 this case.

11:23:10 7 In this case the issue is that, you
11:23:12 8 know, none of the obvious companies would be
11:23:15 9 in Dr. Metz's index.

11:23:17 10 So, the question is does every,
11:23:19 11 every company in the index have to be a
11:23:22 12 perfect comparable? Well, no, it can't ever
11:23:24 13 be. That is why I used a variety of
11:23:28 14 measures.

11:23:28 15 But I think the troubling problem
11:23:30 16 for Dr. Metz is that the obvious comparables
11:23:35 17 aren't even in his.

11:23:38 18 BY MR. BEDNAR:

11:23:38 19 Q. And by that, are you referring to
11:23:41 20 Vale and BHP?

11:23:42 21 A. The large, yes, metal mining
11:23:46 22 companies that aren't U.S.

11:23:48 23 Q. Are all of the companies that are in
11:23:50 24 the eight company comparator index that you used,
11:23:53 25 are all of those obvious comparators, too?

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11:23:56 1 A. You lost me there. I'm sorry. You
11:23:59 2 broke up.

11:23:59 3 Q. The eight companies, in the eight
11:24:02 4 company peer index that you used for some
11:24:04 5 analyses, do you consider all of those to be
11:24:08 6 obvious comparators that should be included in
11:24:10 7 the industry index?

11:24:12 8 A. The company did. The company, the
11:24:14 9 eight comparators were the -- if you are asking
11:24:18 10 about my H8 index, were the ones the company used
11:24:22 11 in 2011. So, yes.

11:24:27 12 Q. Do you consider those to be obvious
11:24:30 13 comparators that should be included in a valid
11:24:33 14 industry index?

11:24:34 15 A. I think that that could be certainly
11:24:38 16 a measure. There is no single perfect measure.
11:24:43 17 The interesting questions for this case actually
11:24:45 18 don't turn on it.

11:24:47 19 But, there is no single question --
11:24:49 20 there is no single perfect answer.

11:24:52 21 Q. Returning to products that are or
11:25:00 22 are not similar to those sold by Rio Tinto.

11:25:04 23 Does the presence of coal companies
11:25:12 24 make any difference to your views on whether the
11:25:17 25 industry index is proper or improper compared to

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11:25:23 1 Rio Tinto?

11:25:25 2 A. Well, again, it is a matter of
11:25:27 3 degree. Coal would be smaller for Rio Tinto,
11:25:33 4 than from some obviously pure play coal
11:25:36 5 companies, if that is your question.

11:25:41 6 Q. What do you mean by pure play coal
11:25:45 7 companies?

11:25:45 8 A. Companies that are in the coal
11:25:47 9 business.

11:25:51 10 Q. When you say coal would be smaller
11:25:54 11 for Rio Tinto, you mean it may be a smaller
11:25:57 12 percentage of Rio Tinto's earnings than say iron
11:26:00 13 ore?

11:26:01 14 A. Vastly smaller, yes.

11:26:03 15 Q. And because coal is the smaller
11:26:06 16 portion of Rio Tinto's earnings, would it be
11:26:09 17 improper to include companies that are focused
11:26:12 18 primarily on coal?

11:26:13 19 A. Again, not necessarily. There is no
11:26:18 20 single perfect answer here. You are never going
11:26:20 21 to find exact comparables.

11:26:24 22 The argument I have with Dr. Metz is
11:26:26 23 not like around the edges, you should have done
11:26:28 24 this, you should have done that.

11:26:29 25 Is that the, A, the exercise isn't

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11:26:33 1 worth doing and, B, it didn't include any of the
11:26:35 2 obvious companies.

11:26:36 3 That is really the issue. It is not
11:26:38 4 about this rounding error discussion.

11:26:46 5 Q. So, when you say you didn't include
11:26:48 6 any of the obvious companies, the S&P Metals and
11:26:52 7 Mining Index has Newmont Mining, right?

11:27:04 8 A. Yes, and indeed the H8, I believe
11:27:07 9 has Newmont Mining.

11:27:08 10 Q. Right. So, is that not one of the
11:27:10 11 obvious companies that needed to be included?

11:27:13 12 A. It would be in the smaller end of
11:27:15 13 big companies. But, yes, that is a company.

11:27:17 14 Q. And, the S&P Metals and Mining Index
11:27:21 15 has Alcoa, right?

11:27:24 16 A. I believe that is true.

11:27:26 17 Q. And that is in the list of eight
11:27:28 18 comparator firms, right?

11:27:29 19 A. That is my recollection, yes.

11:27:35 20 Q. And so is Alcoa not one of the
11:27:39 21 obvious comparators?

11:27:40 22 A. Certainly a comparator from the
11:27:42 23 company's perspective for that year.

11:27:45 24 Q. And, for McMoRan, that is also from
11:27:48 25 the S&P9 mining index, right?

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11:27:50 1 A. I'm sorry. You are breaking up, I
11:27:53 2 couldn't hear.

11:27:53 3 Q. The company is Freeport-McMoRan --

11:28:02 4 A. Okay. I think I heard you say
11:28:05 5 Freeport. I'm not hearing you so --

11:28:06 6 MR. BEDNAR: Okay. Let's go off the
11:28:07 7 record and I will try and fix my headset
11:28:10 8 here. Can we go off the record for a very
11:28:12 9 short break.

11:28:14 10 THE WITNESS: Okay.

11:28:14 11 THE VIDEOGRAPHER: We are going off
11:28:15 12 the record, the time is 11:28 eastern.

11:30:47 13 (Recess taken -- 11:28 a.m.)

11:31:03 14 (After recess -- 11:39 a.m.)

11:38:58 15 THE VIDEOGRAPHER: We are going back
11:39:05 16 on the record. The time is 11:39 eastern.

11:39:10 17 BY MR. BEDNAR:

11:39:10 18 Q. And, Dr. Hubbard, thanks for taking
11:39:14 19 that break. I think my audio should work better
11:39:17 20 now.

11:39:17 21 A. Okay.

11:39:18 22 Q. If at any time you are having
11:39:21 23 trouble hearing me, Doctor, please let me know
11:39:23 24 and I will try and improve the connection.

11:39:25 25 Right before we were breaking, I was

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11:39:27 1 trying to ask you were you aware whether the
11:39:29 2 company Freeport-McMoRan was in the S&P Metals
11:39:34 3 and Mining Index?

11:39:34 4 A. I don't recall, sorry.

11:39:40 5 Q. And, Freeport was one of the eight
11:39:47 6 comparator firms that Rio Tinto identified?

11:39:50 7 A. That is my recollection. It would
11:39:52 8 be in Exhibit 4. But, that is my recollection.
11:39:54 9 I could check. But, I believe that is the case.
11:40:00 10 Exhibit -- yes.

11:40:08 11 Q. Now, before I asked you about those
11:40:13 12 companies, I had asked you about a number of
11:40:16 13 products.

11:40:16 14 What about copper? Is it important
11:40:21 15 for copper to be represented in an industry index
11:40:25 16 that you are using for an event study for Rio
11:40:32 17 Tinto?

11:40:32 18 A. Rio Tinto is in a lot of metals and
11:40:35 19 mining business.

11:40:35 20 The question is are you trying to
11:40:37 21 get companies that are similar both in product
11:40:39 22 and product mix, so you could imagine it.

11:40:47 23 Q. Would it be important to ensure a
11:40:51 24 certain level of representation of copper or not?

11:40:56 25 A. Whether it would be one way or the

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11:41:00 1 other, I don't recall the importance of it to Rio
11:41:04 2 Tinto.

11:41:04 3 What we are trying to do is get a
11:41:08 4 common shock. So, the same thing that would move
11:41:10 5 the industry index would be, you know, important
11:41:12 6 in driving movements in the firm. That is what
11:41:15 7 you are trying to get at. But, I don't recall.

11:41:17 8 Q. What about oil?

11:41:24 9 MR. KIRSCH: Objection. What is the
11:41:25 10 question?

11:41:27 11 BY MR. BEDNAR:

11:41:27 12 Q. Would it be important to have oil
11:41:32 13 represented or not represented in an industry
11:41:34 14 index that is used for a Rio Tinto event study?

11:41:40 15 A. I wouldn't think of it as natural,
11:41:44 16 no. Those are the kinds of shocks that dominate
11:41:49 17 the oil industry. And you couldn't rule it out
11:41:52 18 depending on what else the company does.

11:41:54 19 But if you are asking about oil as a
11:41:56 20 commodity, it wouldn't seem spot on.

11:42:06 21 Q. Would it present any problems to
11:42:10 22 have oil represented in a significant way in an
11:42:14 23 industry index for purposes of a Rio Tinto event
11:42:18 24 study?

11:42:18 25 A. I don't know that it would.

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11:42:44 1 Q. How did you determine what SIC codes
11:42:46 2 were similar for purposes of determining what SIC
11:42:51 3 codes should be represented in an industry index?

11:42:59 4 A. Well, based on the business that the
11:43:00 5 company described, I think early in my report I
11:43:04 6 listed the company's major lines of business, and
11:43:06 7 tried to find the SIC codes that correlate to
11:43:10 8 that.

11:43:10 9 I don't know remember whether the
11:43:11 10 company refers to those in its own documents or
11:43:13 11 not, off the top of my head.

11:43:20 12 Q. And so are you simply looking for
11:43:23 13 SIC codes that contain those products that Rio
11:43:25 14 Tinto -- that are most important to Rio Tinto?

11:43:28 15 A. In a matter of speaking, yes.
11:43:34 16 Companies tracked by segments with SIC
11:43:36 17 identifiers. But yes, trying to get it
11:43:39 18 comparable to Rio Tinto, if that is the question.

11:43:42 19 Q. Okay. And then in terms of SIC
11:43:45 20 codes that aren't similar to Rio Tinto, is that
11:43:48 21 just SIC codes that don't feature products that
11:43:51 22 are important to Rio Tinto?

11:43:52 23 Or how do you make that
11:43:54 24 determination?

11:43:55 25 A. Well, I think that is a very big

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11:43:59 1 one. Another might be very different stages of
11:44:02 2 production so that the shocks are very different.

11:44:06 3 There are a number of reasons two
11:44:09 4 firms may not be common.

11:44:21 5 Q. Is there any authority in peer
11:44:24 6 reviewed literature for determining which SIC
11:44:26 7 codes are or are not similar?

11:44:28 8 A. I think that is a judgment matter.
11:44:36 9 The peer reviewed literature really just talks
11:44:38 10 about in general what makes a good industry
11:44:40 11 index.

11:44:41 12 But, it is obviously up to the
11:44:43 13 researcher to try to identify that and make his
11:44:45 14 or her case.

11:44:46 15 Q. Uh-huh. Now, I think that you
11:44:48 16 alluded to companies that make steel or
11:44:56 17 manufacture other metal products.

11:44:58 18 How does the presence or absence of
11:45:02 19 such companies affect your view of an industry
11:45:05 20 index for a Rio Tinto event study?

11:45:09 21 A. Well, if you think about -- again
11:45:12 22 Rio Tinto's earnings are dominated by iron ore
11:45:17 23 which is an input.

11:45:18 24 But, think about two products. One
11:45:20 25 of which is an input to another. It depends what

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11:45:24 1 kind of shocks you have, whether you would want
11:45:26 2 to view those as being related to one another.

11:45:28 3 So, to be specific, if all shocks
11:45:31 4 are simply to global demand, global demand may
11:45:38 5 raise demand both for final products and for
11:45:41 6 commodities. It would be good for both.

11:45:43 7 Some shocks may affect commodity
11:45:47 8 prices but hurt the firms that use those
11:45:49 9 commodities in terms of their own profits.

11:45:52 10 So, typically you wouldn't want
11:45:55 11 different stages of production, unless you had a
11:45:57 12 theory that all the shocks come from one place.
11:46:00 13 That is a basic index theory.

11:46:04 14 THE VIDEOGRAPHER: If I could jump
11:46:05 15 in for a second. It sounds like we are
11:46:07 16 getting a lot of background noise from
11:46:11 17 call-in user Number 1917670.

11:46:16 18 Would it be possible for them to
11:46:18 19 mute themselves.

11:46:32 20 THE WITNESS: It doesn't look like
11:46:33 21 they are muted. It is not me, but --

11:46:36 22 THE VIDEOGRAPHER: I'm not hearing
11:46:37 23 them now anyway.

11:46:39 24 THE WITNESS: Okay.

11:46:42 25 BY MR. BEDNAR:

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11:46:45 1 Q. And I'm sorry to go back, Doctor,
11:46:47 2 but I asked you about several products and I
11:46:50 3 think I neglected one.

11:46:52 4 What about gold? Is it important to
11:46:54 5 you that gold be represented or not represented
11:46:56 6 in an industry index for a Rio Tinto event study?

11:47:03 7 A. It certainly is an example of a
11:47:08 8 metal. And to the extent that there are similar
11:47:11 9 mixes, I could make arguments either way in an
11:47:15 10 index, depending on mix of businesses the firm
11:47:18 11 is in.

11:47:19 12 Q. I'm talking specifically for Rio
11:47:21 13 Tinto. For an event study here that is
11:47:25 14 evaluating Rio Tinto, is it significant to you
11:47:27 15 that gold either be included or not be included
11:47:30 16 in the industry index?

11:47:33 17 A. I wouldn't say either way. I would
11:47:35 18 say it could or could not.

11:47:39 19 For example, I think some years Rio
11:47:43 20 Tinto included Newmont as a comparison.
11:47:47 21 Sometimes it didn't. So, I think it could go
11:47:49 22 either way.

11:47:54 23 Q. Based on your analysis of Rio
11:47:56 24 Tinto's annual reports, did you reach any
11:48:01 25 conclusion as to whether gold should be

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11:48:03 1 represented in an industry index?

11:48:08 2 A. I think I answered I didn't reach
11:48:10 3 the conclusion. I'm not sure whether the annual
11:48:14 4 report would have helped me.

11:48:14 5 But, I have said you could make the
11:48:16 6 argument either way. The company in some years
11:48:18 7 did include a gold company and in some years it
11:48:22 8 did not.

11:48:22 9 Q. So, specific reference to financial
11:48:26 10 statements. So, I think you concluded iron ore
11:48:29 11 was a very significant part of Rio Tinto's
11:48:32 12 earnings, right?

11:48:33 13 A. About 85 percent, yes.

11:48:34 14 Q. And did you draw any conclusions
11:48:36 15 about the relative significance of gold to Rio
11:48:38 16 Tinto's earnings?

11:48:40 17 A. I really don't recall. It may be in
11:48:44 18 the report, but I don't recall.

11:48:52 19 Q. Same with copper. Do you recall any
11:48:55 20 conclusions about the relative significance of
11:48:57 21 copper to Rio Tinto's earnings?

11:48:59 22 A. I don't. I may have put them in the
11:49:01 23 report. But, aside from memory, it is just the
11:49:04 24 dominance of iron ore.

11:49:05 25 Q. Uh-huh. And I'm sorry to jump

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11:49:21 1 around.

11:49:22 2 But going back to the issue of steel
11:49:24 3 manufacturing companies, to make sure that I
11:49:29 4 understand, you are not expressing views that
11:49:32 5 steel stocks would always be negatively impacted
11:49:37 6 by rising iron ore prices. Is that correct?

11:49:41 7 MR. KIRSCH: Objection.

11:49:42 8 THE WITNESS: That is correct. It
11:49:43 9 would depend on the shock that is generating
11:49:46 10 the movement in both. Nor would it be the
11:49:48 11 case that it is obvious that it would. So,
11:49:52 12 it is --

11:49:52 13 BY MR. BEDNAR:

11:49:53 14 Q. Okay. Did you do any analysis to
11:50:08 15 evaluate the extent to which the stock price
11:50:13 16 returns of iron ore miners are or are not
11:50:17 17 correlated with the stock price returns of steel
11:50:22 18 manufacturers?

11:50:24 19 A. I don't recall doing that, no. I'm
11:50:29 20 not sure why I would.

11:50:29 21 (Audio interference.)

11:50:33 22 -- just made, I wouldn't really
11:50:35 23 learn much other than the stocks that dominated
11:50:39 24 that period.

11:50:40 25 Q. And so I want to put up your report

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11:51:19 1 and take you to Paragraph 36, which is on Page 20
11:51:28 2 of the report, Page 24 of the PDF.

11:51:45 3 And towards the bottom half of the
11:51:47 4 paragraph, you write, "For example, steel
11:51:48 5 manufacturers, which make up 19 percent of
11:51:51 6 Dr. Metz's index, use raw materials such as iron
11:51:56 7 ore and coke in their production.

11:51:57 8 "Therefore an increase in the price
11:51:59 9 of iron ore or other commodities may negatively
11:52:03 10 affect steel manufacturers' earnings and their
11:52:09 11 stock prices, the opposite effect such a price
11:52:13 12 increase would be expected to have on a company
11:52:16 13 like Rio Tinto, whose revenues and profits
11:52:19 14 increase as commodity prices increase."

11:52:21 15 Did I read that correctly? Doctor,
11:52:30 16 did I read that section correctly?

11:52:36 17 MR. KIRSCH: Glenn, I think you are
11:52:38 18 muted.

11:52:44 19 MR. BEDNAR: We are not able to hear
11:52:46 20 you, Doctor. You should check on your phone
11:52:48 21 and your computer to make sure that they are
11:52:51 22 both not on mute.

11:52:56 23 THE WITNESS: The phone is not on
11:52:57 24 mute. I may have to log off --

11:52:59 25 MR. KIRSCH: Okay, Doctor.

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11:53:00 1 THE WITNESS: You got me? Okay.

11:53:01 2 MR. BEDNAR: Yes.

11:53:01 3 THE WITNESS: I don't know what
11:53:01 4 happened. Okay. Sorry.

11:53:01 5 I had answered your question, yes,
11:53:02 6 you did read that correctly.

11:53:03 7 BY MR. BEDNAR:

11:53:04 8 Q. Okay. I was worried that you had a
11:53:07 9 lengthy critique of my reading of that.

11:53:09 10 A. No, no. It is not controversial.

11:53:12 11 Q. Okay. If I can't get that part
11:53:16 12 right, it is going to be a long day.

11:53:19 13 And so, I want to make sure that I
11:53:20 14 understand this sentence where you say that an
11:53:24 15 increase in the price of iron ore or other
11:53:28 16 commodities may negatively affect steel
11:53:31 17 manufacturers' earnings and their stock prices.

11:53:35 18 It also may not negatively affect
11:53:38 19 their earnings and their stock prices, right?

11:53:41 20 A. Right, it would depend on the
11:53:44 21 shocks. And since you don't know what kind of
11:53:46 22 shocks would be dominating data over that period,
11:53:48 23 it wouldn't be a natural marriage for an index.

11:53:51 24 But, yes, depending on the shocks
11:53:53 25 you experience, ex post, that correlation can go

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11:53:56 1 one way or the other.

11:53:57 2 Q. Sure. And, have you done any
11:54:01 3 analysis then to determine whether stock prices
11:54:05 4 are more often correlated with iron ore prices
11:54:08 5 than not?

11:54:11 6 A. Sorry. When you say stock prices,
11:54:13 7 do you mean Rio Tinto, or what?

11:54:15 8 Q. Yes.

11:54:16 9 A. I'm sorry. Correlated with what?

11:54:19 10 Q. Well, have you done either? Did you
11:54:21 11 do any analysis to determine whether Rio Tinto
11:54:23 12 was or was not correlated with the stock prices
11:54:26 13 of the steel company?

11:54:28 14 A. I don't recall. Sorry. I may have.

11:54:34 15 Q. Okay.

11:54:34 16 A. I wouldn't -- I'm not supposed to
11:54:38 17 make the answer because of what that paragraph
11:54:40 18 says, but I don't recall one way or the other.

11:54:41 19 Q. Okay. And did you, if you did,
11:54:44 20 would it be in the backup that was produced with
11:54:46 21 your report?

11:54:48 22 A. Well, I think if it came up, it is
11:54:51 23 in response to Dr. Metz's deposition, where he
11:54:54 24 raised this. And that is the first time I have
11:54:58 25 seen this argument from Dr. Metz.

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11:55:00 1 I don't recall one way or the other.

11:55:02 2 Q. And then similarly, did you do any
11:55:07 3 analysis as to whether -- whether or not there
11:55:12 4 was a correlation between the stock prices of
11:55:15 5 steel companies and the price of iron ore?

11:55:20 6 A. The same answer, I don't recall
11:55:26 7 doing that one way or the other, for the reasons
11:55:28 8 that I state in Paragraph 36.

11:55:42 9 Q. Did you develop a view as to whether
11:55:59 10 for purposes of conducting an event study of Rio
11:56:04 11 Tinto, that a proper industry index should have a
11:56:11 12 correlation to iron ore prices?

11:56:17 13 A. Well, that is an example -- I guess
11:56:20 14 you are trying to get -- you are talking about
11:56:22 15 comparing firms. You are trying to get a firm
11:56:25 16 whose product mix and footprint is as similar as
11:56:29 17 possible. So, in that sense iron ore is very
11:56:34 18 important for Rio Tinto.

11:56:34 19 But, you could be in other
11:56:36 20 businesses, too, if I am understanding your
11:56:39 21 question.

11:56:39 22 Q. Sure. To be a proper index for an
11:56:49 23 event study on Rio Tinto, does the industry index
11:56:51 24 need to be correlated with changes in iron ore
11:56:56 25 prices?

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11:56:57 1 A. That is a hard question to answer
11:57:00 2 because you are looking ex post at data that are
11:57:04 3 subject to different shocks. I think the way I
11:57:08 4 would define it before is it should be, you know,
11:57:11 5 similar footprint as possible which may well mean
11:57:16 6 a correlation by prices.

11:57:19 7 But, I haven't looked at that one
11:57:21 8 way or the other.

11:57:25 9 Q. And I think you had a critique of
11:57:28 10 the S&P Metals and Mining Index because it was
11:57:30 11 down on April 8th, of 2011, while you contend
11:57:34 12 that certain metals prices were up on the day.

11:57:37 13 Do you recall making that critique?

11:57:39 14 A. I do. I didn't just contend it. I
11:57:42 15 mean, that is a fact, but, yes.

11:57:44 16 Q. So, specifically what metals prices
11:57:50 17 do you have in mind?

11:57:52 18 A. I don't remember. I said so in the
11:57:55 19 report. If we need to go find that, if it is
11:57:59 20 important, or --

11:58:00 21 Q. Sure. So, it is -- I can find the
11:58:10 22 page and take you to it in just a moment. So,
11:58:34 23 specifically, Paragraphs 57 and 58 of your
11:58:38 24 report.

11:58:38 25 A. Okay.

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11:58:38 1 Q. Pages 36 and 37 of the PDF.

11:58:43 2 A. I am there.

11:58:44 3 Q. In the hard copy, it is Pages 32 to
11:58:47 4 33.

11:58:48 5 A. Yes.

11:58:48 6 Q. Okay. And so you say that in 57,
11:58:53 7 "Dr. Metz claims there was no confounding
11:58:56 8 information, that is other information released
11:58:58 9 around the same time that could also potentially
11:59:01 10 have an impact on Rio Tinto's ADR price and
11:59:05 11 explain the abnormal returns he finds for Rio
11:59:09 12 Tinto's ADR on April 8, 2011.

11:59:12 13 "However, he failed to consider that
11:59:15 14 metal prices increased on April 8, 2011, which
11:59:18 15 several news reports noted had driven a general
11:59:21 16 increase in stock prices across the mining sector
11:59:24 17 that day."

11:59:25 18 And then you quote from several news
11:59:28 19 sources on that page, also on Paragraph 57. Do
11:59:30 20 you see that?

11:59:35 21 A. Yes.

11:59:41 22 Q. Do you recall what metals prices
11:59:42 23 were up on April 8th?

11:59:52 24 MR. BEDNAR: Doctor, I think you
11:59:53 25 might be on mute again. We are not hearing.

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12:00:00 1 Okay, I think I will ask Glen to
12:00:02 2 take us off the record so Dr. Hubbard can
12:00:07 3 just try to dial right back in.

12:00:08 4 THE VIDEOGRAPHER: We are going off
12:00:09 5 the record, the time is 12 o'clock eastern.

12:00:09 6 (Recess taken -- 12:00 p.m.)

12:01:09 7 (After recess -- 12:01 p.m.)

12:01:09 8 THE VIDEOGRAPHER: We are going back
12:01:19 9 on the record. The time is 12:01 eastern.

12:01:24 10 BY MR. BEDNAR:

12:01:25 11 Q. And, Dr. Hubbard, I will also direct
12:01:27 12 your attention to Paragraph 58 in which you
12:01:32 13 write, "In addition, the Metal Bulletin, which
12:01:35 14 publishes frequently cited iron or price indices
12:01:40 15 reported on April 11th -- or, excuse me, on
12:01:43 16 April 8, 2011, that iron ore stock prices, upon
12:01:47 17 which 85 percent of Rio Tinto's underlying
12:01:51 18 earnings in 2011 relied, had increased." And
12:01:55 19 then you go on further in that paragraph.

12:01:59 20 I want to kind of take you through
12:02:04 21 some of the sources that you cite here.

12:02:09 22 A. Okay.

12:02:10 23 Q. The first would be if we look at the
12:02:14 24 very first bullet point on Page 57 with respect
12:02:17 25 to rising metal prices.

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12:02:18 1 And, in Footnote 164, you cite a
12:02:26 2 news article from the Xinhua News Agency on
12:02:32 3 April 8th.

12:02:32 4 (Exhibit Number 1144
12:02:32 5 marked for identification.)

12:02:32 6 BY MR. BEDNAR:

12:02:33 7 Q. And so, I will pull up Exhibit 1144,
12:02:43 8 which is that article. And as you see, the
12:02:51 9 article in the second paragraph, it has the
12:02:53 10 language that you quoted. That article doesn't
12:02:56 11 identify what the metal prices are that were
12:02:59 12 rising, does it?

12:03:01 13 A. That is correct. I don't see it
12:03:05 14 here.

12:03:05 15 (Exhibit Number 1209
12:03:05 16 marked for identification.)

12:03:06 17 BY MR. BEDNAR:

12:03:06 18 Q. And, in Exhibit 1209, that is the
12:03:22 19 Dow Jones International article that is cited in
12:03:27 20 the next bullet point, Footnote 165 of your
12:03:33 21 report.

12:03:42 22 And, the very first sentence says
12:03:53 23 "FTSE 100 ends higher, led by heavily-weighted
12:03:57 24 mining stocks on the back of firm metals prices."

12:03:58 25 Again, that doesn't specify which

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12:04:02 1 metals' prices rose that day, right?

12:04:05 2 A. Correct.

12:04:05 3 Q. And it actually says on the back of
12:04:09 4 firm metals prices, correct?

12:04:13 5 A. I am sorry. It says firm metal
12:04:15 6 prices. In other words, good metal prices.

12:04:20 7 Q. Yes. Did you take that to mean
12:04:22 8 metals prices were up or metals prices were at
12:04:26 9 the same level? Or can you tell what that means?

12:04:31 10 A. Well, I haven't come back to look at
12:04:36 11 the data in a while.

12:04:37 12 It is highlighting metals as driving
12:04:41 13 prices. So, one would assume high prices, but I
12:04:44 14 haven't gone back to look at the data.

12:04:46 15 Q. In the third bullet point, which
12:04:55 16 cites Footnote 166, you cite a -- it cites a Dow
12:05:08 17 Jones International news article. We were able
12:05:09 18 to identify a Market Watch article with the same,
12:05:14 19 same headline and your same quotation.

12:05:17 20 A. Okay.

12:05:18 21 Q. Do you know as you sit here today --

12:05:21 22 MR. KIRSCH: Tom, I'm sorry, which
12:05:23 23 exhibit are you looking at now?

12:05:23 24 (Exhibit Number 1134
12:05:23 25 marked for identification.)

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12:05:24 1 MR. BEDNAR: Yes, I'm sorry, Mark,
12:05:25 2 it is Exhibit 1134. Exhibit 1134.

12:05:29 3 MR. KIRSCH: Thank you.

12:05:30 4 BY MR. BEDNAR:

12:05:32 5 Q. Dr. Hubbard, do you know, one way or
12:05:34 6 the other, is there a chance that your citation
12:05:37 7 that you could have meant to refer to this Market
12:05:41 8 Watch article, that has the same line and the
12:05:42 9 same text.

12:05:42 10 A. It is certainly possible. You
12:05:44 11 should have all of these in the backup. But, it
12:05:46 12 is certainly possible.

12:05:47 13 Q. Okay. And the first sentence says
12:05:53 14 that, "European markets advance Friday, followed
12:05:58 15 by a rally in Japanese stocks overnight and solid
12:06:06 16 gains for the mining sector as precious metal
12:06:09 17 prices rose once again."

12:06:11 18 What is your understanding in the
12:06:12 19 context of what the precious metals are?

12:06:14 20 A. My recollection is this is just an
12:06:17 21 example of confounding information from a metals
12:06:22 22 price shock occurring at the same time that
12:06:28 23 Dr. Metz thinks he is measuring control. That is
12:06:31 24 I think what all of this is about.

12:06:40 25 Q. What are the precious metals that

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12:06:42 1 are being referred to here?

12:06:43 2 A. It doesn't list them in the
12:06:44 3 articles -- in the article.

12:06:48 4 Q. Was Rio Tinto a miner of precious
12:06:51 5 metals?

12:06:54 6 A. Well, depends on your view of
12:06:57 7 precious. But, not importantly, I wouldn't say.

12:06:59 8 It is a question, metals generally
12:07:01 9 leading together, as the other article suggested.

12:07:04 10 But, no, I don't think of it as
12:07:06 11 principally a precious metal firm.

12:07:09 12 Q. And did you analyze what percentage
12:07:10 13 of the S&P Metals and Mining Index is weighted
12:07:15 14 towards precious metals miners?

12:07:18 15 A. I don't recall doing that, no.

12:07:21 16 Q. What about the HSBC Mining Index?

12:07:24 17 A. I don't recall doing that, no.

12:07:27 18 Q. Okay. This news report doesn't
12:07:36 19 refer to iron ore prices, does it?

12:07:39 20 A. This particular report does not
12:07:41 21 mention iron ore. That is true.

12:07:43 22 Q. If you look at the sixth paragraph
12:07:50 23 down, which on this version is highlighted. The
12:07:54 24 report says, "Miners advanced Friday helped by
12:07:57 25 news that Rio Tinto PLC has clinched a majority

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12:08:01 1 interest in long-pursued Riversdale Mining,
12:08:06 2 boosting chances its takeover offer will be
12:08:09 3 approved."

12:08:09 4 Did I read that correctly?

12:08:10 5 A. You did.

12:08:11 6 Q. The fourth bullet point in
12:08:13 7 Paragraph 57 of your report cites to
12:08:17 8 Footnote 167, which is a Wall Street Journal
12:08:21 9 article. And that is Exhibit 1133.

12:08:25 10 A. Okay.

12:08:25 11 (Exhibit Number 1133
12:08:25 12 marked for identification.)

12:08:25 13 BY MR. BEDNAR:

12:08:25 14 Q. And I will pull that up. The lead
12:08:33 15 of the article refers to solid gains for the
12:08:36 16 mining sector as metal prices rise once again.

12:08:43 17 Do you see in the -- I think it is
12:08:50 18 the sixth paragraph down, there is a reference to
12:08:53 19 it says, "Miners advanced, helped by news that
12:08:56 20 Rio Tinto had clinched the majority interest in
12:08:59 21 long pursued Riversdale Mining."

12:09:02 22 Do you see that?

12:09:02 23 A. I do.

12:09:03 24 Q. And then the next paragraph, this
12:09:06 25 specifies the specific prices. That, "Gold

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12:09:08 1 prices rose once again as a weaker dollar and
12:09:12 2 concerns about inflation led investors to seek
12:09:16 3 refuge in precious metals."

12:09:18 4 Did I read that correctly?

12:09:20 5 A. Yes, along with copper and silver.

12:09:22 6 Q. And silver.

12:09:23 7 A. But, that is what is referred to
12:09:25 8 there.

12:09:25 9 Q. And within the context of reporting
12:09:27 10 on those specific precious metal prices, the Wall
12:09:33 11 Street Journal reported on gains for Barrick
12:09:36 12 Gold, Randgold, which are gold miners. And then
12:09:41 13 the silver miner, Fresnillo, right?

12:09:46 14 A. That is what is in the report, yes.

12:09:47 15 Q. And the article doesn't mention
12:09:48 16 anything about iron ore prices, does it?

12:09:51 17 A. That is certainly true.

12:09:53 18 Q. And then the last bullet point,
12:09:56 19 which goes to Footnote 168, refers to an article
12:10:03 20 in Market Watch. Exhibit 1135.

12:10:03 21 (Exhibit Number 1135
12:10:03 22 marked for identification.)

12:10:03 23 BY MR. BEDNAR:

12:10:23 24 Q. If you go midway through the page,
12:10:24 25 Market Watch writes, "Miners ranked among the top

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12:10:28 1 gainers in London's benchmark index as gold,
12:10:33 2 silver and copper prices rose sharply."

12:10:36 3 And then again there is a reference
12:10:38 4 to Rio Tinto rising after acquiring the majority
12:10:41 5 interest in Riversdale.

12:10:43 6 There is no mention of Rio Tinto in
12:10:45 7 connection with those rising metals prices,
12:10:49 8 correct?

12:10:49 9 A. Not in this article.

12:10:51 10 Q. And there is no mention of iron ore
12:10:56 11 prices in this article?

12:10:57 12 A. That is certainly true.

12:11:02 13 Q. If I take you back to your report,
12:11:19 14 at Paragraph 58. You state that the Metal
12:11:34 15 Bulletin reported on April 8th that iron ore spot
12:11:37 16 prices had increased. Right?

12:11:40 17 A. Yes.

12:11:40 18 Q. And then, taking you down to the
12:11:44 19 bottom of the page. In connection with that
12:11:50 20 statement, you cite in Footnote 168 -- I'm sorry,
12:11:59 21 I'm referring to --

12:12:00 22 A. 170 --

12:12:03 23 Q. Yes. 170, you refer to the Metal
12:12:09 24 Bulletin report as well as the report in the
12:12:10 25 Hobart Mercury, right?

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12:12:13 1 A. Yes.

12:12:13 2 Q. You cite those for the proposition
12:12:27 3 that iron ore spot prices increased on April 8th.
12:12:33 4 Is that correct?

12:12:33 5 A. Yes, sir.

12:12:34 6 Q. And is it your assertion that iron
12:12:37 7 ore prices increased on April 8th or that they
12:12:40 8 increased at some point prior to April 8th?

12:12:44 9 A. That is when it is recorded. I
12:12:47 10 don't really recall the exact news article. When
12:12:52 11 was that announced, I don't recall.

12:12:52 12 (Exhibit Number 1138
12:12:52 13 marked for identification.)

12:12:54 14 BY MR. BEDNAR:

12:12:54 15 Q. Okay. So, pull up Exhibit 1138,
12:13:03 16 which is the report from the Hobart Mercury,
12:13:06 17 dated 8 April 2011.

12:13:10 18 Is this the article that you were
12:13:13 19 citing in Footnote 170 of your report?

12:13:17 20 A. Yes, sir.

12:13:20 21 Q. Do you know what country the Hobart
12:13:23 22 Mercury is published in?

12:13:26 23 A. I would presume Australia or New
12:13:30 24 Zealand. I don't remember which. I'm sorry.

12:13:32 25 Q. That is okay. So, if an article in

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12:13:34 1 the Hobart Mercury has a publication date of
12:13:38 2 8 April, would the date of the publication of
12:13:40 3 that news in New York be the 7th of April 2011?

12:13:43 4 A. Okay.

12:13:49 5 Q. Do you agree with that?

12:13:51 6 A. I am sorry. I don't -- I can
12:13:54 7 certainly see the 8 April. I'm not sure I see
12:13:57 8 the other. But I will accept it subject to
12:14:01 9 check. Sure.

12:14:02 10 Q. And what I'm asking is simply a
12:14:04 11 publication date of 8 April from an Australian or
12:14:08 12 a New Zealand-based publication, that would come
12:14:11 13 out on April 7th in New York, correct?

12:14:15 14 MR. KIRSCH: Objection. Lack of
12:14:16 15 foundation.

12:14:17 16 THE WITNESS: It certainly is not at
12:14:20 17 the same time, if that is your question.

12:14:20 18 (Exhibit Number 1139
12:14:20 19 marked for identification.)

12:14:20 20 BY MR. BEDNAR:

12:14:23 21 Q. Okay. And by way of example, I will
12:14:25 22 show you Exhibit 1139, which is another report
12:14:35 23 from the Hobart Mercury, dated 8 April 2011,
12:14:41 24 titled, Riversdale Gives Okay to Rio's Takeover
12:14:47 25 Bid.

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12:14:47 1 And the lead of the article reads,
12:14:51 2 "Riversdale Mining has recommended shareholders
12:14:54 3 accept Rio Tinto's \$3.9 billion takeover bid
12:14:58 4 after the mining giant gained just under
12:15:02 5 50 percent of the coal miner."

12:15:06 6 Did I read that correctly?

12:15:07 7 A. Yes.

12:15:09 8 Q. And so this April 8th article in the
12:15:12 9 Hobart Mercury is reporting on events of
12:15:15 10 April 7, 2011. Correct?

12:15:17 11 A. Correct.

12:15:18 12 MR. KIRSCH: Objection.

12:15:20 13 BY MR. BEDNAR:

12:15:22 14 Q. Take you back to Exhibit 1138, which
12:15:28 15 is the April 8, 2011, Hobart Mercury report,
12:15:34 16 titled, Mining boom a boost for juniors.

12:15:47 17 So, as you sit here today, do you
12:15:53 18 have a basis for ascertaining on what date in New
12:15:57 19 York this report was published?

12:16:00 20 A. I would have to go back and check.

12:16:03 21 Q. Okay. If it was published on
12:16:08 22 April 7th in New York, would you agree that any
12:16:10 23 news contained in this report would be
12:16:13 24 incorporated into the market on April 7th?

12:16:17 25 A. The question is what time of day it

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12:16:19 1 comes out. As I say, if this is important to
12:16:22 2 you, Ii would have to go back and take a look and
12:16:25 3 be ready next time we meet.

12:16:27 4 Q. And so your assertion that iron ore
12:16:31 5 prices went up and that that news was reported on
12:16:34 6 April 8, to the extent that you rely on this news
12:16:37 7 report in support of that assertion, we would
12:16:39 8 have to check what time it came out. Is that
12:16:42 9 right?

12:16:43 10 A. Not to check what time it came out,
12:16:47 11 but that it was reported on April 8. We would
12:16:50 12 have to check the time between New York and
12:16:51 13 Australia.

12:16:58 14 Q. And, if you look at Paragraph 58 of
12:17:06 15 your report in Footnote 170, the other source
12:17:10 16 that you cite is a Metals Bulletin article. And
12:17:16 17 that is Exhibit 1140.

12:17:19 18 A. Yes.

12:17:19 19 (Exhibit Number 1140
12:17:19 20 marked for identification.)

12:17:20 21 BY MR. BEDNAR:

12:17:20 22 Q. And I am pulling that up so that you
12:17:22 23 can look at it. It is titled, "China Steel Wrap:
12:17:29 24 Shanghai Rebar Up 3 Percent Despite Short Week."

12:17:35 25 That also has a publication date of

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12:17:38 1 8 April 2011. Right?

12:17:42 2 A. Yes.

12:17:43 3 Q. And it has a publication time of
12:17:45 4 5:30 in the morning right under the date. Is
12:17:47 5 that correct?

12:17:48 6 A. It does. I'm not sure what that
12:17:52 7 time refers to where it comes out. But, yes, I
12:17:55 8 can certainly see this, yes.

12:17:57 9 Q. Do you know where Metal Bulletin is
12:18:00 10 published?

12:18:01 11 A. I don't, off the top of my head. I
12:18:03 12 believe it is a Chinese publication, but I don't
12:18:08 13 know off the top of my head.

12:18:09 14 Q. Okay. If I represent to you that
12:18:13 15 Metal Bulletin is a London based publication --

12:18:16 16 A. Okay.

12:18:16 17 Q. -- if you were to accept that
12:18:18 18 assumption for purposes of this question, that
12:18:20 19 means that the time of this report would most
12:18:24 20 likely be just after midnight on April 8th in New
12:18:28 21 York. Correct?

12:18:30 22 A. If the time stamp refers to London
12:18:34 23 time.

12:18:35 24 Q. Correct.

12:18:35 25 A. Yes.

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12:18:36 1 Q. And specifically you cited this
12:18:44 2 Metal Bulletin report in support of your
12:18:47 3 assertion that iron ore prices rose.

12:18:54 4 There are a number of prices
12:18:56 5 recorded in this report.

12:19:00 6 Were you referring to the second
12:19:02 7 sentence that says, "Spot iron ore price up
12:19:06 8 3.3 percent week-on-week at \$186-187?"

12:19:13 9 A. That is the quote. But, that looks
12:19:19 10 like the title. So, yes, that would be among
12:19:21 11 them, yes.

12:19:21 12 Q. Okay. Do you agree the other prices
12:19:25 13 that are referred to here, Shanghai rebar, wire
12:19:32 14 rod, those are prices for finished steel
12:19:36 15 products. Correct?

12:19:36 16 A. That's correct.

12:19:38 17 Q. And so, the specific week-on-week
12:19:41 18 increase in spot iron ore, that is the only iron
12:19:45 19 ore price that is being referred to in this
12:19:47 20 article. Right?

12:19:48 21 A. That is correct. Although this is
12:19:50 22 again referring to the demand shocks. This would
12:19:53 23 technically move everything, going back to our
12:19:56 24 earlier conversation, yes.

12:19:57 25 Q. Right. And, the increase that is

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12:20:00 1 being reported, that is a week-on-week increase,
12:20:03 2 right?

12:20:03 3 A. Yes.

12:20:06 4 Q. Which spot price is being referred
12:20:11 5 to here?

12:20:12 6 A. I really don't recall.

12:20:16 7 Q. Is there only one spot price in the
12:20:20 8 iron ore market as of April of 2011?

12:20:23 9 A. I don't recall one way or the other.

12:20:25 10 Q. Do you have an understanding as to
12:20:26 11 whether there are multiple prices for iron ore,
12:20:30 12 depending on the particular blend of iron ore?

12:20:34 13 A. I would guess that there would be,
12:20:35 14 yes.

12:20:36 15 Q. And that there are different spot
12:20:39 16 prices for iron ore depending on the delivery for
12:20:44 17 the iron ore?

12:20:45 18 A. Well, that is mechanical, yes.

12:20:47 19 Q. And, do you know in April 8, 2011,
12:20:51 20 if there was any particular spot price that
12:20:54 21 was -- was or was not relevant to Rio Tinto?

12:20:57 22 A. I don't recall, sorry.

12:21:04 23 MR. KIRSCH: Objection.

12:21:05 24 BY MR. BEDNAR:

12:21:05 25 Q. You say you don't recall. Is that

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12:21:06 1 something that you analyzed in the course of
12:21:08 2 doing your work on this report?

12:21:11 3 A. I may well have seen that in the
12:21:13 4 search for the early section of the report from
12:21:16 5 the company. But, I really don't recall sitting
12:21:18 6 here today.

12:21:22 7 Q. Your assertion that iron ore prices
12:21:25 8 went up on April 8th, do you rely on any other
12:21:28 9 source for that assertion besides the two
12:21:30 10 articles that you cite in Footnote 170?

12:21:37 11 A. In terms of what is written here,
12:21:39 12 no, I don't.

12:21:41 13 Q. You say in terms of what is written
12:22:01 14 here.

12:22:02 15 Are you relying on any other source
12:22:04 16 of information for your understanding that iron
12:22:07 17 ore prices went up as announced on April 8, 2011?

12:22:10 18 A. Not that I recall, no.

12:22:13 19 Q. And, Paragraph 58 of your report, in
12:23:03 20 the first sentence you state, "In addition, the
12:23:06 21 Metal Bulletin, which publishes frequently cited
12:23:10 22 iron ore price indices, reported on
12:23:13 23 April 8, 2011, that iron ore spot prices upon
12:23:17 24 which 85 percent of Rio Tinto's underlying
12:23:19 25 earnings in 2011 relied had increased."

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12:23:24 1 What is your support for your
12:23:27 2 assertion that 85 percent of Rio Tinto's
12:23:29 3 underlying earnings rely on iron ore spot
12:23:33 4 pricing?

12:23:34 5 A. Well, they come from iron ore, the
12:23:39 6 commodity value which is its stock price.

12:23:43 7 Q. In April of 2011, did Rio Tinto's
12:23:47 8 iron ore sales depend on the spot price --

12:23:50 9 Let me ask that a different way.

12:23:52 10 Did Rio Tinto sell at the spot price
12:23:55 11 as of April 8, 2011?

12:23:58 12 A. I don't recall one way or the other.
12:24:02 13 This is just a statement about the domination of
12:24:04 14 iron ore and the earnings of the company.

12:24:11 15 Q. Well, in literal terms, this is a
12:24:13 16 representation that 85 percent of Rio Tinto's
12:24:17 17 underlying earnings in 2011 relied on iron ore
12:24:20 18 spot prices.

12:24:21 19 I'm asking you what analysis did you
12:24:23 20 do to determine that 85 percent of earnings
12:24:26 21 relied on the spot price as opposed to a
12:24:29 22 different iron ore price?

12:24:32 23 A. If I am understanding your question,
12:24:34 24 all I meant there is that it relies on iron ore,
12:24:38 25 the marginal price and spot price. That is all

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12:24:41 1 it says.

12:24:42 2 Q. So, do you agree with me that Rio
12:24:48 3 Tinto's underlying earnings may just as well
12:24:51 4 depend on longer term iron ore prices as opposed
12:24:55 5 to the spot price?

12:24:57 6 A. We can -- sorry --

12:25:05 7 Q. No, I just wasn't hearing you. Go
12:25:07 8 ahead.

12:25:07 9 A. No, I thought Mr. Kirsch was saying
12:25:10 10 something.

12:25:10 11 It could well depend on both,
12:25:12 12 depending on the contracts that he uses.

12:25:14 13 Q. Did you do any analysis to determine
12:25:16 14 whether or not in April of 2011, Rio Tinto --
12:25:23 15 whether its iron ore sales were priced on a
12:25:26 16 quarterly or other long-term basis?

12:25:29 17 A. No. I don't recall doing that. I'm
12:25:31 18 not sure why I would, no.

12:25:33 19 Q. Would that have been relevant to
12:25:40 20 your assertion that 85 percent of Rio Tinto's
12:25:43 21 underlying earnings rely on the iron ore spot
12:25:46 22 prices?

12:25:47 23 A. Not the sense in which I mean it,
12:25:50 24 no.

12:25:51 25 Q. The sense in which you mean it is

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12:25:53 1 that the iron ore spot price is relevant to Rio
12:25:56 2 Tinto's earnings, rather than that the earnings
12:25:59 3 are dependent on them?

12:26:00 4 A. Yes, the earnings are dependent on
12:26:03 5 iron ore, these marginal price, and spot price.
12:26:09 6 That is all this sentence is trying to say.

12:26:22 7 Q. If there was an increase in iron ore
12:26:25 8 spot prices on April 8th, if we assume that,
12:26:28 9 would that tell you all you need to know about
12:26:30 10 whether or not that would affect Rio Tinto's
12:26:32 11 underlying earnings?

12:26:34 12 A. Well, it is not a well posed
12:26:39 13 question. I guess over what period, what do you
12:26:41 14 think about the time path for iron ore. All of
12:26:45 15 those would be important.

12:26:47 16 Q. Would you for instance want to know
12:26:52 17 whether that change in spot price affected the
12:26:57 18 long-term contracts on which Rio Tinto was
12:27:00 19 selling iron ore?

12:27:03 20 MR. KIRSCH: Objection, vague.

12:27:05 21 THE WITNESS: Well, I'm not quite
12:27:07 22 sure I can answer that. I think what you
12:27:10 23 meant to ask me is, is just the knowledge of
12:27:14 24 the spot price or the current contracts
12:27:17 25 enough.

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12:27:17 1 The question is really more what do
12:27:18 2 you think -- excuse me, is being signalled
12:27:21 3 about expectations of the future marginal
12:27:24 4 prices.

12:27:24 5 So, I wouldn't know enough to know
12:27:28 6 the answer to the question you just asked.

12:27:30 7 BY MR. BEDNAR:

12:27:31 8 Q. Is there an iron ore futures market?

12:27:34 9 A. I believe so.

12:27:35 10 Q. Did you do any analysis of whether
12:27:38 11 iron ore futures prices had changed on April 8th?

12:27:44 12 A. I don't recall doing that, no.

12:27:47 13 Q. If Rio Tinto price contracts on a
12:27:50 14 long-term basis, would iron ore futures price be
12:27:54 15 any more or less relevant than spot prices to Rio
12:27:57 16 Tinto's earnings expectations?

12:28:00 17 A. Based on the structure of contracts,
12:28:03 18 I'm only accepting it for the sake of argument,
12:28:06 19 the way you have described the contracts.

12:28:08 20 The fact that somebody was on a
12:28:10 21 long-term contract doesn't mean that -- I don't
12:28:13 22 know enough of the facts of the contracts to
12:28:15 23 answer the question.

12:28:17 24 Q. Sure. The structure of Rio Tinto's
12:28:19 25 iron ore contracts wasn't something that you

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12:28:21 1 considered in preparing your report. Right?

12:28:22 2 A. No. I can't imagine why I would,
12:28:25 3 but no would be the simple answer.

12:28:26 4 Q. Okay. Because it wasn't relevant to
12:28:29 5 your assertion that 85 percent of underlying
12:28:32 6 earnings relies on the spot price, right?

12:28:35 7 A. In the sense of what I meant it, no,
12:28:37 8 it is not.

12:28:38 9 Q. Okay. And to be clear, you meant it
12:28:39 10 in a different sense from what you wrote it?

12:28:41 11 A. No.

12:28:42 12 MR. KIRSCH: Objection, lacks
12:28:43 13 foundation.

12:28:43 14 THE WITNESS: I read it the way that
12:28:45 15 I'm saying it to you now. You read it
12:28:50 16 differently.

12:29:30 17 MR. KIRSCH: Tom, while you are
12:29:31 18 pausing, it is about 12:30. Let me inquire
12:29:34 19 when we are all going to do lunch today and
12:29:38 20 how long that would be.

12:29:41 21 MR. BEDNAR: I'm coming towards the
12:29:42 22 end of a line of questioning and then we can
12:29:44 23 go off the record and discuss how long you
12:29:45 24 want to take. Does that make sense?

12:29:48 25 THE WITNESS: Sure. Works for me.

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12:29:49 1 MR. KIRSCH: Okay, thank you.

12:29:49 2 (Whereupon, previously marked

12:29:49 3 Exhibit 14, first referral.)

12:29:49 4 BY MR. BEDNAR:

12:29:58 5 Q. Doctor, I'm going to pull up Defense

12:30:02 6 Exhibit 14. That is Rio Tinto's 2011 Annual

12:30:08 7 Report. And I will take you to Page 176 of the

12:30:27 8 PDF. For you, that will be Page 174 of the

12:30:30 9 report itself.

12:30:37 10 This is the notes to the 2011

12:30:39 11 financial statements.

12:30:44 12 A. Okay.

12:30:45 13 Q. Note 31 is titled Financial Risk

12:30:48 14 Management. If you look at the second paragraph,

12:31:06 15 the second sentence says, "In the long-term,

12:31:09 16 natural hedges operate in a number of ways to

12:31:12 17 help protect and save lost earnings and cash

12:31:18 18 flow."

12:31:18 19 Do you see that?

12:31:19 20 A. Yes.

12:31:22 21 Q. The -- if you look at the next

12:31:29 22 paragraph, if you look at the second sentence,

12:31:58 23 "The relationship between commodity prices and

12:32:00 24 the currencies of most of the countries in which

12:32:03 25 the group operates provides further natural

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12:32:05 1 protection in the long-term."

12:32:07 2 Did I read that correctly?

12:32:08 3 A. Yes.

12:32:09 4 Q. The last sentence of that paragraph
12:32:19 5 says, "These natural hedges significantly reduce
12:32:22 6 the necessity for using derivatives or other
12:32:25 7 forms of synthetic hedging. Such hedging is
12:32:28 8 therefore undertaken to a strictly limited degree
12:32:31 9 as described below."

12:32:33 10 Have I read that correctly?

12:32:34 11 A. You have.

12:32:36 12 Q. Did you consider in preparing your
12:32:41 13 report at all the impact of Rio Tinto's natural
12:32:45 14 hedges on the extent to which the spot price of
12:32:48 15 iron ore would impact its earnings?

12:32:53 16 A. I did not, no.

12:32:59 17 Q. Would you agree that if Rio Tinto
12:33:01 18 has natural hedges, that as Rio Tinto says
12:33:06 19 operates in a number of ways to help protect and
12:33:09 20 stabilize earnings and cash flow, that the impact
12:33:13 21 of a change in spot prices on one day on Rio
12:33:19 22 Tinto's underlying earnings may be diminished?

12:33:23 23 A. I don't know that you could conclude
12:33:25 24 that. It would depend on particular currencies.
12:33:29 25 And, so they were giving you examples. And they

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12:33:34 1 are talking over the long-term, not at a point in
12:33:37 2 time. So, I don't think you could know, one way
12:33:40 3 or the other, from that paragraph.

12:33:41 4 Q. You say, to determine the effect of
12:33:42 5 a change on spot prices for any commodity on Rio
12:33:46 6 Tinto's underlying earnings. Would you want to
12:33:50 7 consider the nature of those hedges?

12:33:53 8 A. It is not a well posed question.
12:33:57 9 Earnings when, over what period, for what
12:34:00 10 commodity price assumption?

12:34:02 11 It is just sort of unrelated to the
12:34:04 12 statement in my report. But, I'm happy to
12:34:07 13 answer.

12:34:07 14 Q. Well, the statement in your report
12:34:09 15 is that Rio Tinto's underlying earnings rely on
12:34:13 16 iron ore spot prices.

12:34:14 17 And I'm trying to ascertain whether
12:34:16 18 you consider the presence of natural hedges to be
12:34:20 19 at all relevant to that assertion in your report?

12:34:23 20 A. I didn't consider it. Nothing in
12:34:29 21 this would suggest that it would be terribly
12:34:31 22 important over any particular interval without a
12:34:33 23 lot of other assumptions.

12:34:34 24 So, I don't know how one could. I'm
12:34:37 25 not sure what you are asking me to do. But, I

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12:34:40 1 didn't. That is simple.

12:34:43 2 MR. BEDNAR: We can go ahead and go
12:34:45 3 off the record and I will ask how long you
12:34:47 4 will want.

12:34:49 5 MR. KIRSCH: Okay, thank you.

12:34:51 6 THE VIDEOGRAPHER: All right. We
12:34:52 7 are going off the record. The time is 12:34
12:34:55 8 eastern time.

12:34:55 9 (Recess taken -- 12:34 p.m.)

13:10:07 10 (After recess -- 1:11 p.m.)

13:10:07 11 THE VIDEOGRAPHER: We are going back
13:11:23 12 on the record. The time is 1:11 eastern.

13:11:23 13 (Whereupon, previously marked

13:11:23 14 Exhibit 212, first referral.)

13:11:23 15 BY MR. BEDNAR:

13:11:28 16 Q. Dr. Hubbard, I wanted to put in
13:11:31 17 front of you a copy of Dr. Metz's opening report,
13:11:37 18 which is Exhibit 212, Defense Exhibit 212.

13:11:44 19 A. Okay.

13:11:44 20 Q. And, specifically I will take you to
13:11:47 21 the second page of the report, under the Summary
13:11:51 22 of Opinions, Paragraph 16.

13:11:55 23 So, one of Dr. Metz's opinions is,
13:11:58 24 "After analyzing the market's reaction to Rio
13:12:01 25 Tinto's acquisition of the Riversdale Mining

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13:12:04 1 assets on April 8, 2011, I conclude that this
13:12:07 2 acquisition was accretive.

13:12:10 3 "The market believed that these
13:12:12 4 assets had upside for Rio Tinto and this was
13:12:14 5 reflected in a statistically significant positive
13:12:18 6 excess return in the ADR price that day."

13:12:20 7 Did I read that correctly?

13:12:22 8 A. You did.

13:12:23 9 Q. So, this morning you said several
13:12:27 10 times that you found the issue of April 8th to be
13:12:35 11 irrelevant.

13:12:36 12 Is this specifically the opinion
13:12:38 13 that you find to be irrelevant?

13:12:42 14 A. This opinion I just disagree with.

13:12:45 15 I think the question he is asking to
13:12:49 16 be irrelevant.

13:12:49 17 The question I think in the case is
13:12:51 18 whether an impairment taken at a later date,
13:12:55 19 January of 2013, whether that has an effect on
13:13:00 20 the stock price.

13:13:00 21 Whether the original investment was
13:13:02 22 accretive, break even, value destroying. Is
13:13:08 23 literally unrelated to that question.

13:13:10 24 Now, I disagree with everything in
13:13:13 25 16, but what I was saying this morning is I don't

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13:13:17 1 see why you need it. It is literally a waste of
13:13:20 2 time from an economic perspective. Maybe for the
13:13:28 3 lawyers, there is some legal issue there.

13:13:28 4 But, there is zero economic
13:13:30 5 relevance.

13:13:30 6 Q. Zero economic relevance to what?

13:13:33 7 A. The question I think that is before
13:13:34 8 the court which is about the effect of the
13:13:36 9 impairment on Rio Tinto.

13:13:37 10 Had the original acquisition been
13:13:39 11 accretive, had it exactly broken even, had it
13:13:42 12 been value destroying? Knowing the answer to
13:13:46 13 which one of those it was, doesn't inform the
13:13:48 14 main question.

13:13:49 15 So I don't really see why this is
13:13:52 16 interesting at all.

13:13:54 17 But, yes, I still disagree with
13:13:56 18 everything in 16 on more technical grounds.

13:13:59 19 But I am baffled from an economic
13:14:03 20 perspective on why Dr. Metz thinks this is
13:14:07 21 important.

13:14:07 22 Q. What is the basis of your
13:14:09 23 understanding of what the relevant issues in this
13:14:11 24 case are?

13:14:14 25 MR. KIRSCH: You mean from an

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13:14:15 1 economic perspective?

13:14:24 2 BY MR. BEDNAR:

13:14:24 3 Q. What is the basis --

13:14:24 4 A. Sorry.

13:14:24 5 Q. Yes, I am rephrasing the question.

13:14:26 6 What is the basis for your understanding of what
13:14:28 7 the relevant economic issues in this case are?

13:14:35 8 A. In the complaint, the SEC alleges
13:14:37 9 some action.

13:14:38 10 For example, the impairment
13:14:41 11 affecting the stock price. Getting at that
13:14:44 12 question, which is an economic question and the
13:14:46 13 court will decide it, or jury wherever this goes,
13:14:49 14 does not require knowledge of whether the
13:14:52 15 original investment was accretive or breaks even
13:14:56 16 or is value destroying.

13:14:58 17 It is literally not related. And,
13:15:02 18 unfortunately, Dr. Metz trips up himself in a lot
13:15:08 19 of ways in that analysis, when he needn't have
13:15:11 20 done it at all.

13:15:13 21 From an economic perspective, I
13:15:15 22 don't think there is any disagreement here.

13:15:17 23 Q. But your opinion is not --

13:15:18 24 But, you are not expressing an
13:15:20 25 opinion on what is legally relevant in this case,

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13:15:23 1 are you?

13:15:24 2 A. I can't be. I'm not a lawyer. But
13:15:27 3 I would be astonished if something that is
13:15:32 4 economically irrelevant suddenly has a legal
13:15:35 5 value. But I would have to defer to the
13:15:37 6 attorneys on that.

13:15:38 7 Q. Well, ultimately, you have to defer
13:15:39 8 to the judge on what is relevant in this case,
13:15:41 9 right?

13:15:42 10 A. Well, of course. I just don't think
13:15:44 11 it is from an economic perspective. He or she
13:15:47 12 will decide.

13:15:53 13 Q. And, so it is your contention of
13:16:02 14 Dr. Metz's opinions with respect to April 8,
13:16:05 15 2011, are irrelevant to the issue of the impact
13:16:07 16 of the 2013 impairment on Rio Tinto, correct?

13:16:12 17 A. Partly --

13:16:15 18 MR. KIRSCH: Objection.

13:16:17 19 THE WITNESS: They are both
13:16:18 20 incorrect and irrelevant.

13:16:20 21 They are irrelevant because he
13:16:22 22 mentions the incorrect relevance.

13:16:27 23 BY MR. BEDNAR:

13:16:27 24 Q. So, in terms of assessing whether
13:16:29 25 there is an impact from the 2013 impairment of

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13:16:39 1 RTCM on Rio Tinto, is the only appropriate way to
13:16:44 2 do that through an event study that is focused on
13:16:49 3 January 17th of 2013?

13:16:50 4 MR. KIRSCH: Objection. Tom, when
13:16:52 5 you refer to, quote, on Rio Tinto, unquote,
13:16:55 6 are you talking about share price? Are you
13:16:57 7 talking about something else like cash flow?
13:17:00 8 Can you just clarify what you mean for us.

13:17:03 9 BY MR. BEDNAR:

13:17:03 10 Q. Sure. With respect to the share
13:17:05 11 price of Rio Tinto, is it your conclusion that
13:17:08 12 the only way to assess the impact on the share
13:17:11 13 price of Rio Tinto is by focusing on January 17,
13:17:17 14 2013?

13:17:18 15 A. We certainly would want to focus on
13:17:21 16 January 17th. You may need, as I do, I think
13:17:25 17 Dr. Metz does, looking at other information as
13:17:28 18 well, but it really is the share price that is at
13:17:32 19 the heart of economic issues.

13:17:33 20 And doing that analysis requires no
13:17:36 21 information about April 8th whatsoever. Nothing
13:17:40 22 in that analysis, whether it is the way he did it
13:17:44 23 or the way I did it, requires that knowledge.
13:17:47 24 That is why it is irrelevant.

13:18:10 25 Q. And conducting your event study, did

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13:18:12 1 you do any analysis of the effect of oil prices
13:18:18 2 on Rio Tinto? Specifically Rio Tinto stock?

13:18:25 3 A. I'm not sure what you mean.
13:18:31 4 Eventually you would have a market model and an
13:18:33 5 industry index. Are you asking did I include the
13:18:37 6 price of oil as another variable? No I didn't.
13:18:43 7 So, I'm not sure what you asking.

13:18:43 8 Q. Did you do anything to evaluate
13:18:45 9 whether the price of oil has an effect on Rio
13:18:47 10 Tinto's stock prices?

13:18:49 11 A. If I am understanding your question,
13:18:53 12 no. I am not even sure exactly how you would do
13:18:58 13 that, with both correlation and covariance
13:19:03 14 elements. But, I don't know, you will educate me
13:19:05 15 as we go through your questions.

13:19:07 16 Q. And what are you referring to when
13:19:09 17 you refer to correlation and covariance?

13:19:11 18 A. I'm not sure what your question is.
13:19:13 19 Are you referring to simply are they correlated
13:19:16 20 or are you referring to something more akin to a
13:19:18 21 beta of the stock, which is a covariance term.

13:19:21 22 So, I'm not sure what you are even
13:19:24 23 asking.

13:19:25 24 Q. Did you do any analysis with respect
13:19:27 25 to any relationship between Rio Tinto stock and

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13:19:29 1 oil prices?

13:19:30 2 A. Not that I recall. I'm not sure why
13:19:36 3 I would in January 17th from that study. But, no
13:19:42 4 would be a quick answer.

13:19:45 5 Q. With respect to any date did you do
13:19:46 6 any analysis of any relationship between oil
13:19:49 7 prices and Rio Tinto stock price?

13:19:50 8 A. I don't recall doing that, no.

13:19:53 9 Q. And if you had done so, would that
13:19:57 10 be in the backup materials that were produced
13:19:59 11 with your report?

13:20:01 12 A. It definitely should be, yes.

13:20:02 13 Q. Did you do any analysis with respect
13:20:06 14 to any time period of the -- of any relationship
13:20:10 15 between oil prices and stock price returns for
13:20:14 16 any of the industry indices that are discussed in
13:20:19 17 your expert report?

13:20:22 18 A. So, is your question did I look at
13:20:26 19 whether the indexes are correlated with the price
13:20:28 20 of oil? Whether the components? I'm not sure
13:20:31 21 what you are asking me.

13:20:33 22 Q. Sure, I will take it one step at a
13:20:35 23 time.

13:20:35 24 Did you do any analysis of any
13:20:37 25 relationship between oil prices and the returns

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13:20:40 1 on any of the industry indices at the index
13:20:44 2 level?

13:20:46 3 A. I am not sure why I would. To do so
13:20:52 4 would be very complicated. You are making it
13:20:54 5 sound like it is by variable. It certainly
13:20:55 6 wouldn't be. But, no, I didn't do that.

13:20:56 7 Q. Okay. And so I take that to also
13:20:59 8 mean you didn't do anything to analyze
13:21:01 9 relationships between oil prices and any of the
13:21:03 10 specific constituents in any of the industry
13:21:06 11 indices that we have been talking about in this
13:21:08 12 case, right?

13:21:08 13 A. That's correct.

13:21:09 14 Q. In preparing your report did you
13:21:31 15 check whether there was any news related to
13:21:34 16 commodities' prices other than precious metals
13:21:38 17 and potentially iron ore, on April 8, 2011?

13:21:46 18 A. I have all the news stories, which
13:21:51 19 you maybe mentioned, and I didn't necessarily
13:21:54 20 focus on that. I'm not sure why I would. But I
13:21:57 21 have all of the news articles on this.

13:21:57 22 (Exhibit Number 1258
13:21:57 23 marked for identification.)

13:22:10 24 BY MR. BEDNAR:

13:22:10 25 Q. I'm going to pull up Exhibit 1258.

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13:22:18 1 Exhibit 1258 is a screenshot from the website for
13:22:26 2 the U.S. Energy Information Administration.

13:22:31 3 And under the header, you see that
13:22:34 4 it reports the prices for Europe Brent. Do you
13:22:40 5 see that?

13:22:41 6 A. I don't see anything on the screen
13:22:43 7 other than your face.

13:22:44 8 Q. Oh, I'm so sorry, Doctor. I'm
13:22:45 9 sorry. There is a button I need to push and I
13:22:48 10 didn't push it, so I'm not helping you very much.

13:22:51 11 A. Okay. I've got another copy if --

13:22:51 12 Q. Yes, everyone should have it.

13:22:56 13 A. Got it.

13:22:56 14 Q. That exhibit Plaintiff's 1258, do
13:22:59 15 you agree that appears to be a screenshot from
13:23:01 16 the U.S. Energy Information Administration's
13:23:04 17 website?

13:23:04 18 A. I agree that that is what it looks
13:23:06 19 like.

13:23:07 20 Q. Listing spot prices for Europe
13:23:12 21 Brent?

13:23:12 22 A. That is what it says, yes.

13:23:14 23 Q. And Brent is a common type of crude
13:23:18 24 oil, right?

13:23:18 25 A. Yes.

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13:23:19 1 Q. Take you to Page 19 of the PDF.
13:23:24 2 And you see a listing for prices by
13:23:30 3 week in 2011.

13:23:32 4 In the middle of the page, do you
13:23:34 5 see prices for April 4th to April 8th, that week
13:23:39 6 of 2011?

13:23:44 7 Do you see that line on the page?

13:23:45 8 A. I do. It starts at 120.07.

13:23:48 9 Q. And then at the end of the week
13:23:50 10 April 8th, it is at 126.30. Is that right?

13:23:53 11 A. That's correct.

13:23:54 12 Q. The day before, April 7th, spot
13:23:58 13 prices for Brent crude were at 122.90; is that
13:24:05 14 right?

13:24:05 15 A. Yes.

13:24:05 16 Q. So, fair to say that there is a jump
13:24:09 17 of \$3.40 between April 7th and April 8th?

13:24:15 18 A. It is fair to say the price changed,
13:24:18 19 yes.

13:24:18 20 Q. Would that type of news be negative,
13:24:23 21 positive, or neutral for Rio Tinto?

13:24:29 22 A. Well --

13:24:30 23 MR. KIRSCH: Objection.

13:24:30 24 THE WITNESS: I'm not sure what you
13:24:33 25 mean. Are you saying that for the company's

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13:24:36 1 currently -- the stock price?

13:24:39 2 BY MR. BEDNAR:

13:24:39 3 Q. Yes. For the company's -- first,
13:24:42 4 for the company's earnings, would changes in fuel
13:24:45 5 prices be positive, negative, or neutral for
13:24:48 6 earnings?

13:24:49 7 A. They should be positive. For stock
13:24:54 8 prices, who knows. It is really about the
13:24:57 9 present value of all of the future and oil prices
13:25:01 10 are volatile.

13:25:02 11 I'm not sure what to make of this.
13:25:05 12 I didn't review it.

13:25:06 13 Q. Why do you say that a change in spot
13:25:08 14 oil prices would be positive for earnings?

13:25:12 15 Do you mean that it would increase
13:25:14 16 earnings or decrease earnings?

13:25:15 17 A. I don't -- I think that -- don't
13:25:18 18 they -- well, I should take a look. Let me look
13:25:23 19 here. This is not something that I considered,
13:25:25 20 so --

13:25:30 21 Q. Okay. Let me take you to --

13:25:32 22 A. I didn't -- go ahead. Sorry.

13:25:35 23 Q. I'm sorry. What were you going to
13:25:39 24 say, Doctor? I didn't mean to interrupt.

13:25:40 25 A. Well, I was just looking for their

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13:25:41 1 energy group to see what their exposure was.

13:25:44 2 But, it wasn't something I did.

13:25:44 3 Q. Okay. And were you looking at the
13:25:47 4 energy group to see if Rio Tinto sells oil?

13:25:50 5 A. Yes.

13:25:51 6 Q. Okay. And you are not sure whether
13:25:57 7 or not Rio Tinto sold oil among its products in
13:26:00 8 2011?

13:26:01 9 A. I don't recall.

13:26:05 10 Q. Okay. I'm showing you defense
13:26:07 11 Exhibit 14. This is the Rio Tinto 2011 annual
13:26:10 12 report.

13:26:12 13 Taking you to page 14 of the PDF,
13:26:15 14 which is Page 12 of the report. This is
13:26:23 15 Section 4, Disclosure of Sustainable Development
13:26:28 16 Risks. And in the first box, under Sustainable
13:26:32 17 Development Risks, the first sentence says, "Rio
13:26:34 18 Tinto's operations are energy intensive and
13:26:37 19 depend heavily on fossil fuels."

13:26:40 20 Do you see that?

13:26:41 21 A. Yes.

13:26:42 22 Q. And as far as your research showed
13:26:46 23 in this case would you agree that as a mining
13:26:50 24 company Rio Tinto was heavily dependent on fossil
13:26:52 25 fuels for its operations?

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13:26:54 1 A. Certainly, it is a very energy
13:26:57 2 intensive activity, yes.

13:26:58 3 Q. I will take you then to Page 32 of
13:27:00 4 the report, which is Page 34 of the PDF. On the
13:27:07 5 right-hand side of the page, at the top of the
13:27:10 6 page, there is a section for energy, other cash
13:27:14 7 costs and exploration.

13:27:16 8 And in the first sentence Rio Tinto
13:27:18 9 states that, "Higher energy costs across the
13:27:20 10 group reduced underlying earnings by \$249 million
13:27:25 11 U.S. compared with 2010."

13:27:27 12 Did I read that correctly?

13:27:29 13 A. Yes.

13:27:31 14 Q. Does that affect your opinion one
13:27:33 15 way or the other on whether oil prices would tend
13:27:37 16 to be positive or negative for Rio Tinto's
13:27:39 17 earnings?

13:27:41 18 A. To the extent that it is consumer,
13:27:44 19 an only consumer, obviously it will be negative.

13:27:44 20 (Exhibit Number 1257
13:27:44 21 marked for identification.)

13:28:00 22 BY MR. BEDNAR:

13:28:00 23 Q. I'm going to take you to
13:28:04 24 Exhibit 1257, which is the report by
13:28:11 25 PricewaterhouseCoopers titled Mine, The Growing

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13:28:17 1 Disconnect. Do you see that?

13:28:17 2 A. Yes.

13:28:18 3 Q. And the subheading on that first
13:28:20 4 page says A Review of Global Trends in the Mining
13:28:24 5 Industry, 2012.

13:28:28 6 I take you to Page 22 of the
13:28:30 7 report -- I'm sorry, if you will indulge me for
13:28:46 8 one moment. I have the wrong page.

13:28:58 9 If you will indulge me for just one
13:29:01 10 moment, I want to make sure that I have you on
13:29:03 11 the right page before I ask you a question about
13:29:05 12 the exhibit.

13:29:06 13 A. Okay.

13:29:17 14 Q. I'm actually at Page 28 of the
13:29:19 15 report. There is a table listing different
13:29:28 16 commodity prices in the upper right of that page.
13:29:31 17 Do you see that?

13:29:32 18 A. Yes.

13:29:37 19 Q. And underneath the table PwC writes,
13:29:42 20 "Mining activities are energy intensive in
13:29:44 21 nature. Fuel and electricity are key costs.
13:29:48 22 Prices for Brent crude oil on which fuel prices
13:29:51 23 are highly related were, on average, 39 percent
13:29:54 24 higher in 2011 than in 2010."

13:29:57 25 Did I read that correctly?

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13:29:58 1 A. You did.

13:29:59 2 Q. Do you have any basis for disputing
13:30:01 3 PwC's assertion that Brent crude oil prices were
13:30:04 4 higher in 2011 than in 2010?

13:30:08 5 A. No, none whatsoever.

13:30:10 6 Q. And so, with respect to oil prices,
13:30:22 7 when it comes to industry indices, let's start
13:30:26 8 first with the S&P Metals and Mining Index.

13:30:29 9 Would you expect oil prices to have
13:30:33 10 different effect on stock prices for mining
13:30:38 11 companies that don't sell oil versus those that
13:30:42 12 do?

13:30:44 13 A. Well, it certainly depends on the
13:30:47 14 mix, but if you sell oil, obviously you are a
13:30:50 15 beneficiary. If you are only an energy user, you
13:30:55 16 are, all else equal, a loser.

13:30:56 17 Although I would remind you that
13:30:59 18 areas of high oil prices could be areas of
13:31:01 19 demand. So, it is good news elsewhere.

13:31:03 20 So, again getting back to the stocks
13:31:09 21 argument, I don't know where you are going with
13:31:11 22 this.

13:31:11 23 Q. Are there any companies in the S&P
13:31:17 24 Metals Mining Index in 2011 that were oil
13:31:19 25 producers?

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13:31:20 1 A. I can't recall one way or the other.

13:31:26 2 Q. What about the HSBC Mining Index,
13:31:29 3 were there any other companies with oil
13:31:31 4 operations?

13:31:32 5 A. I don't recall.

13:31:37 6 Q. You don't recall or is that
13:31:39 7 something that you checked for?

13:31:41 8 A. I would have looked at operations of
13:31:43 9 key components. But, I don't recall sitting here
13:31:45 10 today.

13:31:46 11 Q. Okay. So, do you recall whether in
13:31:48 12 2011 the BHP Billiton had significant oil
13:31:54 13 operations?

13:31:55 14 A. I think we covered that in my
13:31:59 15 previous answer. No, I don't recall.

13:32:27 16 Q. I'm going to put that exhibit back
13:32:31 17 up. Exhibit 1257. And take you to Page 5.

13:32:39 18 To the left of the table at the top
13:32:41 19 of Page 5, PwC writes, "Copper stands out as an
13:32:47 20 exception to this disconnect. The HSBC Global
13:32:52 21 Mining Index has generally tracked copper
13:32:54 22 prices."

13:32:54 23 Do you see that?

13:32:56 24 A. I see that.

13:32:58 25 Q. And PwC goes on to observe that,

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13:33:01 1 "Looking back since 2000, even though the HSBC
13:33:05 2 Global Mining Index includes miners of a
13:33:06 3 multitude of different products, the index and
13:33:09 4 copper prices have generally moved in sync."

13:33:15 5 A. I see the words on the page, if that
13:33:17 6 is what you are asking.

13:33:18 7 Q. So, it is your opinion that iron ore
13:33:28 8 is the most important commodity for Rio Tinto.
13:33:31 9 Right?

13:33:34 10 A. Yes. You can't infer necessarily
13:33:39 11 what PwC is saying from the picture they drew.

13:33:42 12 My guess is there is a strong
13:33:45 13 positive correlation between the winning speed at
13:33:47 14 the Indy 500 and GDP, but I doubt you want to
13:33:53 15 call it causation.

13:33:57 16 Q. Well, PwC doesn't observe any
13:34:00 17 correlation between iron ore prices and the HSBC
13:34:05 18 Mining Index, correct?

13:34:07 19 A. PwC doesn't talk about it. I can't
13:34:07 20 be in the head of the author of the study.

13:34:09 21 Q. Let me take that off the page for
13:34:14 22 now.

13:34:15 23 A couple of minutes ago,
13:34:18 24 Dr. Hubbard, you were making some points about
13:34:22 25 economic materiality in the context of the effect

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13:34:29 1 of the 2013 impairment of RTCM on Rio Tinto.

13:34:38 2 Can you define economic materiality
13:34:44 3 as you use that term in your report?

13:34:45 4 A. Sure. I don't recall saying that a
13:34:49 5 few minutes ago. I can certainly define it right
13:34:52 6 now.

13:34:53 7 From an economic perspective, I
13:34:55 8 can't speak for the law, material would mean in
13:34:57 9 the securities context something that a
13:35:00 10 reasonable investor would want to know that would
13:35:05 11 be important in changing the price at which that
13:35:08 12 investor would trade a security.

13:35:11 13 So, to economists, materiality is,
13:35:14 14 in a securities context, is in the price of the
13:35:17 15 security. So, that is why there is an emphasis
13:35:19 16 on statistically significant price changes,
13:35:22 17 things like event studies. And it follows from
13:35:25 18 that definition of economically material to an
13:35:28 19 investor.

13:35:29 20 I can't speak if that is the law,
13:35:31 21 but to an economist, that's what it would mean,
13:35:34 22 with materiality.

13:35:35 23 Q. And within economics are stock
13:35:38 24 prices the only way of thinking of economic
13:35:40 25 materiality?

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13:35:41 1 A. It depends what you are trying to
13:35:43 2 do. If your allegation, like I think yours was,
13:35:47 3 that the impairment affected stockholders, then,
13:35:50 4 yes. I think you would want to look at stock
13:35:53 5 prices.

13:35:53 6 Q. Is that the only way to assess the
13:35:55 7 impact of an event in terms of economic
13:35:59 8 materiality?

13:36:00 9 A. In this case, yes, because the point
13:36:03 10 is to ask whether a reasonable investor, had they
13:36:07 11 known something you say they should have known,
13:36:10 12 would have paid a different price.

13:36:11 13 So, yes, it is about the stock
13:36:14 14 price. There may be other legal implications. I
13:36:17 15 can't speak to those.

13:36:17 16 But from an economic perspective
13:36:19 17 that is it.

13:36:41 18 THE WITNESS: I apologize, somebody
13:36:45 19 appears to be running a mining company on my
13:36:46 20 sidewalk. So, I hope it is not affecting my
13:36:56 21 sound.

13:36:56 22 MR. BEDNAR: No, I can't hear that.

13:36:56 23 THE WITNESS: Okay. Good.

13:36:57 24 MR. BEDNAR: I have all sorts of
13:36:59 25 questions about that mining company, but I

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13:37:02 1 won't ask you them.

13:37:03 2 BY MR. BEDNAR:

13:37:03 3 Q. So, the context of what you were
13:37:15 4 just saying, are you saying that -- I just want
13:37:17 5 to make sure I understand you.

13:37:18 6 Are you saying that investors only
13:37:20 7 buy and sell based on the current stock price?

13:37:23 8 A. I'm not sure what you are asking.
13:37:29 9 The question --

13:37:30 10 The concept of economic materiality
13:37:33 11 would be am I getting information that would
13:37:38 12 change my willingness to do a transaction at this
13:37:45 13 price, buys, sell, hold.

13:37:47 14 You are always doing something.
13:37:48 15 Even if you are holding, you are not selling.
13:37:48 16 You are not buying.

13:37:51 17 So, would that information have
13:37:52 18 changed a reasonable investor's decision? If the
13:37:55 19 answer to that is no, then it is not material,
13:37:58 20 from an economic perspective.

13:38:00 21 Q. Okay. And an individual investor's
13:38:02 22 decision may be based on other factors besides
13:38:04 23 the current price of the stock, right?

13:38:06 24 A. I don't think that is the standard,
13:38:08 25 at least for an economist view of materiality.

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13:38:13 1 If you like buying companies that start with R,
13:38:15 2 that is your perspective.

13:38:17 3 But I don't think that is what
13:38:18 4 securities laws is about, right, from an
13:38:20 5 economics perspective.

13:38:22 6 The question is would a reasonable
13:38:24 7 investor with that information have changed the
13:38:26 8 price he or she was willing to pay.

13:38:28 9 Q. I'm taking you back to the issue of
13:38:39 10 industry indices. We started to discuss this a
13:38:43 11 little bit in the morning. I think that one of
13:38:45 12 your -- one of your opinions is that if one were
13:38:51 13 to do an event study in this case, for any date,
13:38:56 14 that the S&P Metals and Mining Index is not a
13:39:00 15 proper index because it doesn't have certain
13:39:03 16 companies that are comparable to Rio Tinto,
13:39:06 17 right?

13:39:08 18 A. I don't believe it is the best index
13:39:11 19 that could be used. I don't believe it would be
13:39:13 20 appropriate, no.

13:39:14 21 It doesn't matter for some of the
13:39:18 22 event studies, but I do agree with that.

13:39:20 23 Q. Okay. Is there a best industry
13:39:24 24 index?

13:39:29 25 MR. KIRSCH: Could you define that,

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13:39:32 1 Tom?

13:39:32 2 BY MR. BEDNAR:

13:39:33 3 Q. For an event study -- an equity
13:39:33 4 event study with Rio Tinto, is there a best
13:39:35 5 industry index?

13:39:36 6 A. Well, your purpose in looking at an
13:39:38 7 industry index goes back to what we were talking
13:39:40 8 about this morning, is finding and defining the
13:39:46 9 industry in a set that is most comparable to Rio
13:39:49 10 Tinto. And we had a disagreement this morning
13:39:52 11 about what Dr. Metz and I think that is.

13:39:54 12 So, I prefer my indices to his.

13:40:02 13 Q. Of the two indices that you used in
13:40:05 14 your analysis, the Eight Firm Index and the HSBC
13:40:09 15 Mining Index, do you have an opinion as to
13:40:10 16 whether one or the other of those is better?

13:40:14 17 A. Well, the company looked at the HSBC
13:40:17 18 index, and I think it is entirely appropriate.
13:40:20 19 The H8, either the way I did it or following
13:40:24 20 Dr. Metz's critique, just look at the firms that
13:40:26 21 are in every year which is I think is in H7.

13:40:30 22 Any of those strike me as relevant,
13:40:32 23 and important. I don't know that they get
13:40:35 24 different answers, typically, but they strike me
13:40:37 25 as reasonable.

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13:40:38 1 Q. And so you don't have an opinion as
13:40:43 2 to whether the HSBC or the Eight Firm Index is
13:40:49 3 better than the other?

13:40:51 4 A. If I take the HSBC, the index, I use
13:40:56 5 the H8 as a check.

13:40:57 6 And as I told you this morning, I
13:40:59 7 did a number of other checks, too, of the
13:41:02 8 indices, but they all pretty much point in the
13:41:04 9 same direction.

13:41:05 10 The difference is with respect to
13:41:10 11 S&P Metal.

13:41:17 12 Q. And, I am -- I didn't hear the first
13:41:20 13 part of your answer, and it is not clear to me
13:41:22 14 from the record.

13:41:23 15 Did you say --

13:41:25 16 A. The HSBC index is what I had talked
13:41:27 17 about first. The H8 is corroborating. And as we
13:41:31 18 talked about this morning, I did a number of
13:41:33 19 other corroborating exercises, but they all more
13:41:35 20 or less give you the same answer.

13:41:38 21 Q. Okay. Did you choose the HSBC
13:41:41 22 Mining Index on your own or because it was listed
13:41:44 23 in Rio Tinto's annual reports?

13:41:47 24 A. Well, no. I mean since I have to
13:41:50 25 ultimately make a decision, but when I saw Rio

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13:41:53 1 Tinto's use of it and comparators, I was totally
13:41:58 2 fine with that. I think it is a reasonable
13:42:00 3 index. It included the companies that I thought
13:42:03 4 were most important.

13:42:04 5 And I didn't see other easily
13:42:05 6 available indices ahead. So, I constructed
13:42:08 7 others as back up, if you will, but I don't
13:42:12 8 really think it is.

13:42:17 9 Q. So, had you already thought of the
13:42:20 10 HSBC Mining Index before you saw it in Rio
13:42:22 11 Tinto's reports?

13:42:26 12 A. You mean do I wake up at night
13:42:31 13 thinking of the HSBC Mining Index?

13:42:33 14 Q. No. When you said about conducting
13:42:35 15 an event study in this case, did it occur to you
13:42:37 16 to use the HSBC Mining Index, or did that occur
13:42:40 17 to you after you read Rio's reports?

13:42:47 18 A. I certainly read Rio's reports.
13:42:50 19 Generally, it is not something that I don't wake
13:42:52 20 up in the morning thinking of mining indices.

13:42:55 21 But I do think the justification
13:42:57 22 given was reasonable. The coverage is
13:42:59 23 reasonable. And all of the corroborating
13:43:00 24 information are just pointed the same direction.
13:43:04 25 So, I think it is fine.

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13:43:05 1 Q. When you say that the justification
13:43:07 2 for the HSBC Mining Index was reasonable, what
13:43:10 3 are you referring to?

13:43:12 4 A. Well, that the company referred to a
13:43:15 5 benchmark.

13:43:52 6 Q. Okay. Is that --

13:43:52 7 A. Sorry.

13:43:53 8 Q. We will carry on, and then maybe at
13:43:55 9 a break we can talk about whether you have like a
13:43:58 10 headset or something that will put the microphone
13:44:01 11 on the mouth which will cut down on the
13:44:03 12 background noise.

13:44:04 13 So, did Rio Tinto in its annual
13:44:13 14 reports uses the HSBC Mining Index for any sort
13:44:17 15 of events study?

13:44:19 16 A. No. Why on earth would we use a
13:44:22 17 mining index event study in an annual report. I
13:44:26 18 can't imagine why you would. So, no.

13:44:39 19 THE WITNESS: When you get to the
13:44:40 20 end of this line of questioning, if you like,
13:44:42 21 I can see if I can pry headphones away from
13:44:45 22 one of my kids.

13:44:47 23 MR. BEDNAR: Let's keep going for a
13:44:48 24 little bit, as long as --

13:44:50 25 THE WITNESS: No, no. I'm just

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13:44:51 1 saying whenever I can do that.

13:44:53 2 MR. BEDNAR: No, I appreciate that.

13:44:54 3 And, Lori, if it becomes, something
13:44:57 4 where you just can't hear, let us know, and
13:44:59 5 we will break earlier.

13:44:59 6 BY MR. BEDNAR:

13:45:04 7 Q. So --

13:45:06 8 MR. KIRSCH: Tom, and everyone got
13:45:09 9 used to New York City being quiet.

13:45:09 10 THE WITNESS: Exactly, the
13:45:13 11 construction is back.

13:45:16 12 MR. KIRSCH: It is now shocking,
13:45:18 13 hearing noise again.

13:45:19 14 BY MR. BEDNAR:

13:45:20 15 Q. Dr. Hubbard, do you view
13:45:27 16 AngloAmerican as a useful comparator firm for Rio
13:45:31 17 Tinto; is that right?

13:45:32 18 A. Yes, it was one of the firms.

13:45:36 19 Q. If Dr. Metz had added AngloAmerican
13:45:41 20 to the S&P Metals and Mining Index, would that
13:45:46 21 have changed your opinion?

13:45:47 22 A. Not -- I don't know what you mean by
13:45:51 23 opinion. Would it rehabilitate the index, is
13:45:53 24 that your question?

13:45:54 25 Q. Yes.

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13:45:57 1 A. I don't think you can really get
13:45:58 2 there from here, because the whole thesis of the
13:46:03 3 S&P index, it starts with the U.S. Canadian
13:46:07 4 company. So, it is not the S&P index any more.

13:46:09 5 If you are saying would he add any
13:46:11 6 companies to effectively replicate what I did,
13:46:14 7 would I agree with it? Sure.

13:46:15 8 But, that is not what he did.

13:46:25 9 Q. Is AngloAmerican essential? If
13:46:26 10 there an industry index that has some or all of
13:46:28 11 the other eight comparator firms, but it doesn't
13:46:31 12 have AngloAmerican, is that still a valid index?

13:46:34 13 A. I don't follow the question.

13:46:37 14 Q. So, if you had the eight firm
13:46:41 15 comparator index that you used for some of your
13:46:43 16 analyses and you took AngloAmerican out of it,
13:46:46 17 would that still have been a valid industry index
13:46:49 18 in your opinion?

13:46:52 19 A. If it is the right comparator, I'm
13:46:54 20 not sure why I would take it out of it, if that
13:46:57 21 is your question.

13:46:57 22 The one I took out was a concern
13:47:01 23 Dr. Metz had about wanting to be in every year.
13:47:03 24 So to have that comparator list, I would need a
13:47:06 25 name on.

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13:47:06 1 But, I don't know the principal
13:47:07 2 reason for taking out AngloAmerican, unless I am
13:47:11 3 just not understanding what you are asking.

13:47:13 4 Q. I am not asking you did you do it.
13:47:15 5 I'm asking you, if AngloAmerican was removed,
13:47:18 6 would that index be sufficiently comparable to
13:47:20 7 Rio Tinto to be used in an event study?

13:47:24 8 A. Let me just answer, I don't see a
13:47:26 9 principled reason for doing that. I haven't done
13:47:28 10 it, so I don't know what the answer is, if that
13:47:30 11 is your question. But I don't see a --

13:47:32 12 Q. I am asking you to make an
13:47:34 13 assumption?

13:47:34 14 MR. KIRSCH: Hang on. Please let
13:47:36 15 him finish. Glenn, were you finished with
13:47:38 16 your answer?

13:47:38 17 THE WITNESS: I am finished. I'm
13:47:40 18 sorry.

13:47:40 19 BY MR. BEDNAR:

13:47:42 20 Q. Dr. Hubbard, I'm sorry, I didn't
13:47:44 21 mean to cut you off. I did think that you were
13:47:46 22 finished.

13:47:47 23 If I were to ask you to assume that
13:47:50 24 AngloAmerican was not in the eight firm
13:47:53 25 comparator index, would that still be a valid

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13:47:57 1 index to compare to Rio Tinto?

13:48:00 2 A. I think it would be less good than
13:48:03 3 the index that I have, so I can't imagine that it
13:48:05 4 would be.

13:48:07 5 Q. If I were --

13:48:08 6 If you were to remove any one firm
13:48:15 7 would the removal of that one firm be a reminder
13:48:19 8 that that would be an invalid index?

13:48:21 9 A. I don't know what you mean by
13:48:22 10 invalid.

13:48:23 11 MR. KIRSCH: Objection.

13:48:25 12 THE WITNESS: The only removal that
13:48:26 13 I did was really a response to Dr. Metz. I
13:48:30 14 removed Newmont because it wasn't in every
13:48:32 15 year.

13:48:32 16 But, otherwise, I don't -- if you
13:48:35 17 are asking me can I cherry pick different
13:48:37 18 companies and get different answers, I don't
13:48:39 19 know. I didn't do it.

13:48:39 20 But, in terms of, is it principled?
13:48:42 21 No, it is not. I like the list I have. If
13:48:45 22 you have another list, use it.

13:48:48 23 BY MR. BEDNAR:

13:48:48 24 Q. And what I'm asking you is, the list
13:48:51 25 that you have, which Rio Tinto compiled, not you,

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13:48:55 1 are there any companies that are essential to
13:48:58 2 that list for you to deem it be valid for use in
13:49:04 3 an event study?

13:49:05 4 A. Earlier I said I don't know what
13:49:07 5 invalid means in this context. I will add to
13:49:10 6 that the word, essential.

13:49:11 7 I think the index I used is the
13:49:13 8 right one. Dr. Metz would now want to propose an
13:49:17 9 H6 and a half or 7 or whatever else he is doing,
13:49:19 10 go do it.

13:49:20 11 But, I like the event, the index
13:49:22 12 that I have for the reasons that I said.

13:49:26 13 Q. And I'm asking you, would you
13:49:28 14 consider that -- let me put it this way.

13:49:34 15 If AngloAmerican was not in that
13:49:36 16 index, if Rio Tinto had not listed AngloAmerican,
13:49:39 17 do you have any view on whether that would have
13:49:41 18 been an index that you would have used for
13:49:43 19 analysis in an event study?

13:49:44 20 A. If Rio Tinto had not used it. I
13:49:48 21 would look very hard and figure out why. I would
13:49:50 22 wonder why a large global mining company had been
13:49:53 23 excluded.

13:49:54 24 But if the company had a good reason
13:49:56 25 for not doing it, I would follow that. I mean,

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13:49:58 1 that is not a question about validity. It is
13:50:00 2 trying to find what the company considers its
13:50:02 3 comps to be, comparable firms to be.

13:50:06 4 Q. Did you give any consideration to
13:50:07 5 whether there were companies -- let me ask it
13:50:23 6 this way.

13:50:24 7 Do you agree with Dr. Metz that
13:50:25 8 during the time period that he alludes to in his
13:50:27 9 report, 2008 to 2014, that at different times for
13:50:31 10 different periods of its long-term incentive
13:50:34 11 program Rio Tinto had slight differences in the
13:50:36 12 companies that were listed as comparators, right?

13:50:38 13 A. I do, and that is why I did the
13:50:42 14 sensitivity that I mention that would take back
13:50:45 15 that concern.

13:50:47 16 Q. Specifically, what sensitivity did
13:50:50 17 you do?

13:50:51 18 A. We have talked about it a few times
13:50:52 19 already. His concern was well, what about things
13:50:56 20 that are there every year. And so, I think
13:50:59 21 there -- Newmont was the only one of the eight
13:51:03 22 that wasn't there every year, so I removed
13:51:06 23 Newmont and got the same answer.

13:51:08 24 Q. There was one company that was there
13:51:10 25 every year except for the incentive period that

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13:51:15 1 ended in 2011. Do you recall that? It was Teck
13:51:19 2 Resources. Do you recall that?

13:51:21 3 A. I don't recall that one way or the
13:51:23 4 other. I recall Dr. Metz chatting about it in
13:51:26 5 his deposition, but I don't recall it in any
13:51:28 6 other context.

13:51:50 7 Q. Let me go ahead and pull up
13:51:54 8 Dr. Metz's rebuttal report, because I want to
13:51:57 9 show you the table that he has in that report.

13:51:57 10 (Whereupon, previously marked
13:51:57 11 Exhibit 225, first referral.)

13:51:57 12 BY MR. BEDNAR:

13:52:10 13 Q. The Exhibit Number is 225 and I will
13:52:13 14 navigate to the page for you.

13:52:15 15 Page 19 of the report, I will put it
13:52:23 16 up on the screen. That is Table 1.

13:52:33 17 So, Table 1 shows the companies that
13:52:36 18 were listed in the long-term incentive program
13:52:39 19 comparator lists for the periods ending 2008
13:52:44 20 through 2014.

13:52:48 21 Do you agree with that?

13:52:50 22 A. Agree with what? That this is what
13:52:54 23 he has on the page or agree with some point?
13:52:56 24 What are you asking me to agree with?

13:52:58 25 Q. The first question is do you agree

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13:53:00 1 that that is what is on this page?

13:53:01 2 A. I agree that that is what he says is
13:53:04 3 on this page, yes.

13:53:05 4 Q. Did you or your team go through the
13:53:08 5 annual reports to verify that the information on
13:53:11 6 the page is accurate as to when the different
13:53:13 7 companies were listed for the long-term incentive
13:53:17 8 program comparators?

13:53:20 9 A. I don't recall. We may well have.

13:53:26 10 Q. Do you see part way down the page
13:53:30 11 the Teck Resources a/k/a Teck Cameco, T-E-C-K was
13:53:38 12 listed for all of the incentive program periods
13:53:42 13 except for one ending in 2011? Do you see that?

13:53:46 14 A. Yes.

13:53:47 15 Q. Okay. Did you run any sensitivity
13:53:51 16 on your eight firm comparator index if Teck
13:54:01 17 Cameco was added to that index?

13:54:03 18 A. I don't recall doing that. I know
13:54:06 19 Dr. Metz talked about it in his deposition. So,
13:54:10 20 I know his view. But, I don't recall doing it
13:54:13 21 because it was different than his other
13:54:14 22 criticism.

13:54:15 23 I know he talked about them. I had
13:54:17 24 not checked it myself.

13:54:19 25 Q. So, am I correct that the one

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13:54:21 1 sensitivity you ran on the eight company index
13:54:24 2 from 2011 was to back Newmont out of it; is that
13:54:29 3 right?

13:54:30 4 A. Yes.

13:54:30 5 Q. Any other sensitivity that you ran
13:54:33 6 on the Eight Firm Index?

13:54:36 7 A. Not on the Eight Firm Index.
13:54:38 8 Because that, I -- you know, I am shadow boxing
13:54:42 9 here because he keeps changing. But what he had
13:54:46 10 complained about was not being in every year, so
13:54:48 11 I tried to follow that. But that is what I did.

13:54:51 12 Q. Is there any reason to exclude Teck
13:54:58 13 from the index?

13:55:03 14 A. I'm not sure what that question is
13:55:05 15 about. It does -- it is not responsive to
13:55:09 16 Dr. Metz's nor was it part of my original
13:55:13 17 exercise. So I'm not sure why I would include
13:55:16 18 it, but I'm not quite sure what the question is.

13:55:19 19 Q. Okay. You said your use of the
13:55:22 20 eight company comparator index, is the reason
13:55:25 21 that you used those eight companies is that they
13:55:28 22 were the eight companies listed by Rio Tinto for
13:55:31 23 the compensation period ending 2011?

13:55:34 24 A. Yes.

13:55:36 25 Q. Was there any other reason that you

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13:55:37 1 used those eight companies?

13:55:39 2 A. No.

13:55:49 3 Q. Given that you see Teck listed in
13:55:52 4 Table 1 for all year, except the period ending
13:55:57 5 2011, do you have any basis as you sit here today
13:56:00 6 to render an opinion as to whether Teck Resources
13:56:04 7 is comparable to Rio Tinto for purposes of
13:56:09 8 including it in an industry index?

13:56:12 9 A. Can I have it -- analyze this. I'm
13:56:16 10 just looking at it, the other exercise I did was
13:56:18 11 in response to what I thought Dr. Metz's critique
13:56:23 12 was. If there was a different one, I've got to
13:56:25 13 go back and look.

13:56:26 14 But I have also looked at the
13:56:28 15 top 10, the top 15. I have looked at a number of
13:56:30 16 them and they don't make a difference.

13:56:32 17 I don't recall --

13:56:33 18 Q. The top 10 or 15 of what?

13:56:34 19 A. So, looking at the top 10 or 15 of
13:56:38 20 the HSBC index.

13:56:41 21 Q. Okay. Which is different from
13:56:43 22 looking at the companies that Rio Tinto listed as
13:56:45 23 comparators, right?

13:56:46 24 A. Correct. I'm just saying I did a
13:56:48 25 lot of sensitivity analysis.

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13:56:50 1 Q. Okay. We are turning to
13:57:15 2 AngloAmerican.

13:57:15 3 Did you form any view as to why
13:57:18 4 AngloAmerican was an essential comparator other
13:57:24 5 than the fact that Rio Tinto had listed it?

13:57:27 6 A. I don't know what you mean by
13:57:28 7 essential, what would be the motivation for using
13:57:33 8 Rio Tinto comparators, but I lined the business
13:57:36 9 and the companies that used it.

13:57:37 10 So, I don't know what essential is,
13:57:39 11 but that is what I did.

13:57:40 12 Q. Okay. You specifically criticize
13:57:46 13 the S&P Metals and Mining Index because it did
13:57:49 14 not include AngloAmerican, correct?

13:57:51 15 A. Among others, yes.

13:57:52 16 Q. Did you have a reason for that,
13:57:57 17 other than the fact that Rio Tinto had listed it?

13:58:00 18 A. I think we talked about it before
13:58:03 19 lunch, which is trying to get at large globally
13:58:07 20 diversified miners, of which that is one.

13:58:18 21 Q. And is the important part that they
13:58:20 22 be large and diversified or just the specific
13:58:24 23 product mix part of your opinion?

13:58:26 24 MR. KIRSCH: Objection, vague.

13:58:28 25 THE WITNESS: No, I think if, for it

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13:58:32 1 to be comparable, you want it to be
13:58:34 2 relatively large firms as opposed to just a
13:58:37 3 very small firm. And that could certainly be
13:58:41 4 the company issue.

13:58:43 5 BY MR. BEDNAR:

13:58:44 6 Q. And so what analysis did you perform
13:58:46 7 to determine that AngloAmerican was comparable in
13:58:58 8 terms of products with Rio Tinto?

13:59:05 9 A. Well, I am going from memory here.
13:59:07 10 It certainly meets the size categorization. And
13:59:12 11 when we looked at product mixes of the top firms
13:59:14 12 it was, you know, always of a diversified miner.
13:59:18 13 So, I don't recall off the top of my head exactly
13:59:21 14 what we did.

13:59:21 15 Q. Okay. In 2011, AngloAmerican was
13:59:40 16 the world's Number 3 exporter of steelmaking
13:59:45 17 coal. Were you aware of that?

13:59:48 18 A. I don't recall one way or the other.

13:59:58 19 Q. Well, did you consider the role that
14:00:03 20 coal plays to AngloAmerican's operations
14:00:07 21 determining that it is a good comparator for Rio
14:00:12 22 Tinto?

14:00:12 23 A. As I say, I don't recall all of the
14:00:15 24 product mix analysis that we did. It is the same
14:00:18 25 answer.

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14:00:19 1 Q. So, if you considered that, would it
14:00:22 2 be spelled out in your report?

14:00:24 3 A. Well, we talked about the
14:00:26 4 characteristics in the report. So, it is
14:00:29 5 obviously a qualitative conclusion, that the
14:00:31 6 company had come to that conclusion, too. But, I
14:00:34 7 don't recall sitting here today.

14:00:34 8 Q. Okay. Your materials considered in
14:00:40 9 Appendix B to your report lists many different
14:00:44 10 annual reports that were reviewed in preparing
14:00:47 11 your report. Right?

14:00:48 12 A. Yes, sir.

14:00:49 13 Q. So, you or members of your team
14:00:52 14 reviewed the annual reports for companies that
14:00:55 15 were in the eight firm list of comparators,
14:01:01 16 right?

14:01:01 17 A. Yes, sir.

14:01:02 18 Q. And, so if AngloAmerican's 2011
14:01:20 19 annual report disclosed that it was the Number 3
14:01:23 20 exporter of metallurgical coal in the world,
14:01:26 21 would you have considered that at the time in
14:01:28 22 comparing it to Rio Tinto?

14:01:30 23 A. I'm sure we considered whatever we
14:01:33 24 read. As I said, sitting here today, I don't
14:01:37 25 recall. It is essentially the same answer.

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14:01:39 1 Q. Okay. So, does that also mean that
14:01:47 2 you are representing that you would have
14:01:49 3 considered that AngloAmerican owned the world's
14:01:53 4 largest platinum reserves in 2011?

14:01:57 5 A. We looked at all of the companies'
14:01:59 6 lines of businesses. I just don't recall them
14:02:01 7 off the top of my head.

14:02:02 8 Q. Was Rio Tinto involved in selling
14:02:07 9 platinum in 2011?

14:02:08 10 A. Not to my knowledge, that I recall.

14:02:12 11 Q. Did you or a member of your team do
14:02:16 12 any analysis of whether the fact that
14:02:20 13 AngloAmerican had the world's largest platinum
14:02:23 14 reserves with the level, if any, of platinum
14:02:28 15 operations that Rio Tinto had?

14:02:32 16 A. I'm not even sure what you are
14:02:34 17 asking me. I'm not sure what that means at the
14:02:38 18 end of the day.

14:02:38 19 We were looking at large globally
14:02:42 20 diversified miners that did overlapping, if not
14:02:45 21 very similar, product courses.

14:02:47 22 So, I can't recall, as I said to
14:02:51 23 you, what all that we looked at. It is the same
14:02:54 24 answer every time you ask the question.

14:02:56 25 Q. Part of what I'm trying to get at is

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14:02:59 1 you are saying overlapping product mixes; is that
14:03:01 2 right? That is what you are looking for?

14:03:03 3 A. Well, where possible. Obviously you
14:03:05 4 want to get as close as possible. You are never
14:03:08 5 going to get perfection.

14:03:10 6 Q. Explain to me what level of overlap
14:03:13 7 between product mixes is sufficient for you to
14:03:17 8 determine that a company is a useful comparator
14:03:20 9 for an event study.

14:03:21 10 A. There is really no line in the sand
14:03:25 11 answer there. That is why I do take comfort of
14:03:30 12 the company's own decision to look out at its
14:03:33 13 competitors on a FSR, functional return.

14:03:41 14 Q. And so, do you have a similar answer
14:03:48 15 if I ask you whether you considered the fact that
14:03:50 16 in 2011 AngloAmerican owns De Beers which is one
14:03:55 17 of the world's leading diamond companies?

14:03:59 18 A. I hear the statement part, but what
14:04:03 19 is the question part?

14:04:04 20 Q. The question is whether you
14:04:05 21 considered that.

14:04:06 22 A. I don't know what consider means.
14:04:08 23 I'm sure we reviewed all of that information.

14:04:10 24 Q. Did you personally give
14:04:17 25 consideration to that?

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14:04:18 1 A. Just sitting here today, I don't
14:04:19 2 really recall everything that is in all of those
14:04:22 3 annual reports. Sorry, same answer.

14:04:31 4 Q. Was Rio Tinto a diamond producer in
14:04:33 5 2011?

14:04:36 6 A. I don't recall. I don't think so.
14:04:38 7 But, I don't recall.

14:04:43 8 Q. So, do you have any recollection of
14:04:46 9 any consideration that you gave to how the fact
14:04:50 10 that AngloAmerican owned one of the world's
14:04:54 11 leading diamond companies factored into your
14:04:56 12 determination that AngloAmerican was a useful
14:05:00 13 comparator for Rio Tinto?

14:05:02 14 A. I don't recall. I'm not sure why I
14:05:05 15 would. You could be very important in some other
14:05:08 16 market but still very much in the other
14:05:10 17 businesses. So, I'm not sure why it is relevant.
14:05:13 18 But, the actual answer is I don't recall.

14:05:16 19 Q. Okay. Is it relevant to you at all
14:05:24 20 who the other companies in the eight firm
14:05:29 21 comparator index, who they list as their
14:05:31 22 competition?

14:05:33 23 Is that relevant at all?

14:05:36 24 A. I think it depends on the purpose
14:05:38 25 for which they do it and how they explain what

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14:05:41 1 they do.

14:05:43 2 Q. Well, if the purpose is to benchmark
14:05:46 3 against their competition, would that be relevant
14:05:49 4 to you?

14:05:50 5 A. It is not typically the way
14:05:52 6 companies write, so you have to be a little more
14:05:55 7 specific.

14:05:55 8 That can be the product market.
14:05:57 9 That could be for analogues. It could be for
14:05:58 10 executive compensation. I'm not sure what you
14:06:02 11 are referring to. That method is describing how
14:06:04 12 you feel.

14:06:04 13 Q. If the company that was on Rio
14:06:09 14 Tinto's eight firm comparator list compiles its
14:06:14 15 own list of competitors for purposes of
14:06:19 16 compensation, would that be relevant to you?

14:06:22 17 A. May or may not. Depending on how
14:06:24 18 they do it, the importance of other businesses.
14:06:27 19 They may have. They may be looking for something
14:06:30 20 slightly different.

14:06:30 21 So, I don't know one way or the
14:06:33 22 other. I was asked to analyze this company, Rio
14:06:36 23 Tinto.

14:06:36 24 (Exhibit Number 1166
14:06:36 25 marked for identification.)

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14:06:40 1 BY MR. BEDNAR:

14:06:40 2 Q. So, I will show you Exhibit 1166.

14:07:08 3 And I will take you first to the cover. Do you

14:07:16 4 see that that is AngloAmerican's 2011 annual

14:07:21 5 report?

14:07:21 6 A. I see that.

14:07:22 7 Q. I will take you to Page 107 of the

14:07:27 8 PDF, which I think is also Page 107 of the

14:07:30 9 report.

14:07:30 10 This is part of the governance

14:07:33 11 section of the annual report.

14:07:35 12 A. Okay.

14:07:35 13 Q. In Section 3.5 you see AngloAmerican

14:07:42 14 describing its long-term incentive program -- or

14:07:45 15 I'm sorry. The long-term incentive plan?

14:07:48 16 MR. KIRSCH: Sorry. Tom, what page

14:07:49 17 are you on?

14:07:51 18 MR. BEDNAR: 107.

14:07:51 19 MR. KIRSCH: Thank you.

14:07:52 20 BY MR. BEDNAR:

14:07:52 21 Q. And at the bottom right there is a

14:07:54 22 Figure 6, which is a -- which is titled Sector

14:07:58 23 Index. Do you see that?

14:07:59 24 A. Yes.

14:08:00 25 Q. And, in fact, AngloAmerican does

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14:08:04 1 list Rio Tinto as one of its competitors. You
14:08:07 2 see that, right?

14:08:07 3 A. Yes.

14:08:12 4 Q. And AngloAmerican lists Teck Cominco
14:08:16 5 Limited as one of its competitors, correct?

14:08:19 6 A. I'm not sure if it is a competitor.
14:08:21 7 I mean, it is a comparator. And I'm not sure
14:08:23 8 exactly for what purpose --

14:08:23 9 Q. That is a fair point. Yes, that is
14:08:25 10 a fair point. I'm sorry.

14:08:25 11 A. Okay.

14:08:25 12 Q. It specifically says comparator
14:08:28 13 companies, not competitor companies, right?

14:08:30 14 A. Right. Well, those are different
14:08:32 15 things, so that is why I corrected.

14:08:34 16 Q. Sure. And, so for long-term
14:08:36 17 incentive plan, so for the same purpose that Rio
14:08:39 18 Tinto has a list of comparator firms,
14:08:45 19 AngloAmerican has a list of comparator firms,
14:08:47 20 right?

14:08:48 21 A. Yes, again I'm not sure what metric
14:08:50 22 or how to get it. But, yes, I can clearly see
14:08:53 23 that.

14:08:53 24 Q. Do you know how Rio Tinto compiled
14:08:55 25 their list of comparator firms?

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14:08:57 1 A. I believe they were looking at total
14:09:03 2 shareholder return correlations and line of
14:09:05 3 business judgments. I don't recall.

14:09:09 4 Q. So, if you look at the paragraph at
14:09:12 5 the bottom left of this page that we are on,
14:09:13 6 Page 107, the AngloAmerican report says, "Half of
14:09:17 7 each award is subject to a group total
14:09:20 8 shareholder earn measure while the other half is
14:09:23 9 subject to a group operational method."

14:09:26 10 Do you see that?

14:09:27 11 A. Yes, but it has nothing to do with
14:09:32 12 comparator companies, but -- to the extent a
14:09:38 13 group does not refer to that group.

14:09:40 14 Q. So, if the total shareholder return
14:09:46 15 measure was applied to the returns of the
14:09:49 16 comparator firms, would that be similar to what
14:09:52 17 Rio Tinto is describing?

14:09:55 18 MR. KIRSCH: Objection.

14:09:57 19 THE WITNESS: You would think they
14:09:59 20 did. I'm not really sure what they did. The
14:10:02 21 paragraph you are reading is a different
14:10:04 22 point about how compensation is decided in
14:10:07 23 the [garbled] based on lines of business --

14:10:08 24 BY MR. BEDNAR:

14:10:09 25 Q. Sure. And I, I understand that

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14:10:12 1 distinction.

14:10:12 2 So, if AngloAmerican had used the
14:10:15 3 total shareholder return measure based on the
14:10:17 4 comparators, that would be the same measure that
14:10:20 5 Rio Tinto would be using in its comparator index.
14:10:23 6 Right?

14:10:25 7 MR. KIRSCH: Objection.

14:10:26 8 THE WITNESS: No, depending on
14:10:29 9 whatever qualitative judgment they applied,
14:10:31 10 what time period. I don't know. It might
14:10:32 11 be.

14:10:33 12 BY MR. BEDNAR:

14:10:33 13 Q. Okay. So, that is the information
14:10:36 14 that you would want to look at to try to
14:10:39 15 determine a comparison between AngloAmerican's
14:10:42 16 comparator list and Rio Tinto's comparator list,
14:10:44 17 right?

14:10:44 18 A. I'm not sure why I would want to do
14:10:47 19 that.

14:10:47 20 You are asking about it. From me
14:10:50 21 writing a report, I can't imagine why I would do
14:10:52 22 that.

14:10:53 23 Q. Okay. In any event, AngloAmerican
14:10:58 24 for the year 2011 lists Rio Tinto as a
14:11:01 25 comparator, right?

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14:11:02 1 A. Yes, it is on the list.

14:11:04 2 Q. And lists Teck has a comparator,
14:11:07 3 right?

14:11:07 4 A. It is also on the list.

14:11:10 5 Q. Just as Rio Tinto for all, but one,
14:11:13 6 of the periods compiled by Dr. Metz listed Teck
14:11:17 7 as a comparator, right?

14:11:19 8 A. If that is what it stated, yes.

14:11:23 9 Q. I'm going to direct you just briefly
14:12:01 10 before we leave that exhibit, the last couple of
14:12:04 11 questions on that exhibit, again is 1166. I'm on
14:12:08 12 the next page, Page 108.

14:12:10 13 The middle column, at the top of the
14:12:13 14 page --

14:12:16 15 A. Okay.

14:12:16 16 Q. -- says Total Shareholder Return.
14:12:19 17 And the second paragraph says, "50 percent of the
14:12:22 18 proportion of each award that is based on TSR is
14:12:28 19 measured against the sector index, and 50 percent
14:12:30 20 is measured against the constituents of the 50,
14:12:34 21 100." Do you see that?

14:12:35 22 A. Okay.

14:12:36 23 Q. And so, is that a similar method for
14:12:40 24 using the comparator index that Rio Tinto uses?

14:12:45 25 A. I don't really recall the weighting

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14:12:47 1 in Rio Tinto and over what time period.

14:12:50 2 I don't know. They both mention the
14:12:54 3 word TSR, if that is the point of your question.

14:12:54 4 (Exhibit Number 1162
14:12:54 5 marked for identification.)

14:13:29 6 BY MR. BEDNAR:

14:13:29 7 Q. I'm going to take you to
14:13:31 8 Exhibit 1162, which is the 2011 annual report on
14:13:41 9 Form 20-F for HP Billiton.

14:13:47 10 Can you see it on your screen?

14:13:50 11 A. Yes, I can.

14:13:51 12 Q. And you or members of your team
14:13:54 13 reviewed this report when preparing your own
14:13:56 14 report. Right?

14:13:57 15 A. Yes. We did. And in the binders, I
14:14:00 16 am reminded how massive it is.

14:14:03 17 Q. Yes, it is 577 pages, a lot of
14:14:08 18 events to report.

14:14:08 19 If I take you to Page 235 of the
14:14:13 20 PDF, which is Page 229 of the report. This is
14:14:21 21 BHP's Billiton's long-term incentive program
14:14:24 22 awards.

14:14:25 23 And you see at the middle of the
14:14:27 24 page, they have comparator groups for different
14:14:30 25 time periods that are covered as well. Do you

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14:14:32 1 see that?

14:14:33 2 A. I do.

14:14:34 3 Q. And do you see Rio Tinto is covered
14:14:35 4 in all three of the periods. Right?

14:14:39 5 A. Yes.

14:14:42 6 Q. And then two lines before that Teck
14:14:48 7 Cominco is in two of the three periods, right?

14:14:51 8 A. Yes.

14:14:51 9 Q. And the two are the periods 2004 to
14:14:54 10 2006, right?

14:14:59 11 A. Yes.

14:14:59 12 Q. Now, you also see in this list of
14:15:01 13 comparator firms a number of oil and gas
14:15:03 14 companies, right?

14:15:04 15 A. Yes.

14:15:04 16 Q. Like ExxonMobil, Marathon Oil,
14:15:10 17 Shell.

14:15:13 18 Does it at all affect the
14:15:16 19 comparability of BHP to Rio Tinto that BHP has
14:15:21 20 significant oil operations in 2011, whereas Rio
14:15:25 21 Tinto did not?

14:15:29 22 A. It needn't, no.

14:15:32 23 Q. Why not?

14:15:37 24 A. Well, then you are not going to get
14:15:38 25 a precise product mix. The question is there

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14:15:41 1 this close an overlap as possible. Both
14:15:45 2 companies consider the other to be a comparable.
14:15:47 3 So, you have sort of answered your own question.

14:15:52 4 Q. And, did you --

14:16:06 5 Was Xstrata one of the companies
14:16:08 6 that you were under the opinion should have been
14:16:15 7 included in the S&P Metals and Mining Index?

14:16:19 8 A. I think it is in that page. I would
14:16:21 9 have to go back and look at Exhibit 4. Bancorp.
14:16:27 10 Let's see.

14:16:36 11 Q. Sure, and I can --

14:16:37 12 A. Sure, it is in the related peer
14:16:40 13 index.

14:16:40 14 Q. And specifically I will show you
14:16:42 15 just to kind of complete the record on that,
14:16:44 16 Paragraph 36 of your report in the second
14:16:48 17 sentence points out that Dr. Metz does not
14:16:51 18 include a number of comparators including
14:16:54 19 AngloAmerican, Xstrata, BHP and Merrick Gold,
14:17:02 20 okay?

14:17:03 21 A. Okay.

14:17:10 22 Q. Was there anything in particular
14:17:11 23 about Xstrata that you think made it a useful
14:17:15 24 comparator to Rio Tinto other than the fact that
14:17:17 25 Rio Tinto listed it as a comparator?

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14:17:22 1 MR. KIRSCH: Objection.

14:17:23 2 THE WITNESS: I think this spot
14:17:24 3 combined being a large diversified miner.

14:17:29 4 BY MR. BEDNAR:

14:17:30 5 Q. Okay. And do you recall which
14:17:44 6 metals Xstrata was mainly involved in mining?

14:17:49 7 A. I don't, off the top of my head.

14:17:51 8 Q. Now, they don't need to be the same
14:18:00 9 exact list of metals that Rio Tinto mines?

14:18:03 10 A. It would be rare to find companies
14:18:08 11 that are an exact clone.

14:18:08 12 Q. Is there sort of any measure of
14:18:10 13 overlap that you need in terms of the product
14:18:12 14 that Xstrata mines versus the product that Rio
14:18:14 15 Tinto mined?

14:18:15 16 A. You asked me that question earlier.

14:18:16 17 MR. KIRSCH: Objection. In order to
14:18:17 18 what?

14:18:18 19 BY MR. BEDNAR:

14:18:19 20 Q. In order to be a useful comparator
14:18:20 21 for an industry index.

14:18:22 22 A. You asked that question earlier.
14:18:24 23 So, the answer is the same. There is no bright
14:18:29 24 line. It is a matter of judgment.

14:18:31 25 And certainly the company's

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14:18:32 1 judgment. You are probably going to show me
14:18:35 2 Xstrata's annual report and we will now see its
14:18:38 3 judgment.

14:18:38 4 That is the best way I can know how
14:18:40 5 to answer it.

14:18:41 6 Q. And in terms of products, does it
14:18:50 7 matter for determining whether Xstrata and Rio
14:18:56 8 Tinto are useful comparators for the event study
14:18:59 9 that Xstrata is focused on copper, coal, nickel
14:19:04 10 and zinc?

14:19:07 11 Does that particular product mix
14:19:11 12 matter to whether it is a good comparator?

14:19:13 13 A. There is overlap there, and you just
14:19:17 14 purported to show me a chart a few minutes and
14:19:20 15 that copper is in HSBC Mining.

14:19:34 16 Q. Well, does the fact that Xstrata is
14:19:36 17 focused on copper, and copper tends to move the
14:19:41 18 HSBC Mining Index, what does that say about
14:19:43 19 whether Xstrata is a useful comparator to Rio
14:19:47 20 Tinto for an event study?

14:19:49 21 MR. KIRSCH: Objection. Vague.

14:19:53 22 THE WITNESS: I'm not sure what you
14:19:54 23 are asking. But, with the HSBC indexes comes
14:19:58 24 up with a mining index. We talked about
14:20:01 25 that. It is now purported to show that it is

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14:20:05 1 about copper. I already questioned whether
14:20:07 2 that is a valid study that you showed me and
14:20:11 3 pictured it.

14:20:12 4 To me what makes it comparable is
14:20:15 5 back to the same. Is it similar enough?
14:20:17 6 Does the company judge it to be similar
14:20:19 7 enough to make it a comparable firm?

14:20:22 8 For your line of questions to make
14:20:24 9 sense, you have to believe that excluding all
14:20:27 10 large miners makes a better index. And that
14:20:33 11 is about a head structure.

14:20:36 12 BY MR. BEDNAR:

14:20:45 13 Q. So, you are saying that in terms of
14:20:48 14 product mix, it has to be similar enough that the
14:20:53 15 company considers it a comparator firm. Is that
14:20:55 16 right?

14:20:57 17 MR. KIRSCH: Objection.

14:20:59 18 THE WITNESS: I think -- I did say
14:21:00 19 that, that the company could be important as
14:21:04 20 far as judgment in some analysts. But, yes,
14:21:09 21 all of that is important.

14:21:10 22 BY MR. BEDNAR:

14:21:10 23 Q. Did you do an analysis of whether
14:21:12 24 the product mix of Xstrata and Rio Tinto was
14:21:15 25 similar enough to be a useful comparator for an

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14:21:19 1 industry index?

14:21:20 2 A. You asked that question earlier,
14:21:22 3 too, so it will be the same answer. You asked it
14:21:25 4 in a different company, same answer.

14:21:26 5 But, we did. I think, we, Kevin and
14:21:30 6 I would read all of these, and made qualitative
14:21:34 7 conclusion along with the information in the
14:21:36 8 company's report. That is what we did.

14:21:40 9 Q. And so to the extent that you
14:21:52 10 reached any opinions on whether the product mix
14:21:55 11 of Xstrata and Rio Tinto are sufficiently
14:22:00 12 comparable to be comparators for an industry
14:22:03 13 index, would that be spelled out in the report or
14:22:05 14 in the backup materials --

14:22:06 15 A. Yes.

14:22:07 16 Q. -- which is in the appendices?

14:22:10 17 A. Yes.

14:22:11 18 Q. Okay. So if it is not in the report
14:22:17 19 or in the appendices or exhibits, you don't have
14:22:20 20 an opinion on what would make the product mix of
14:22:23 21 an Xstrata sufficiently comparable to a Rio Tinto
14:22:27 22 to be useful comparators for an event study?

14:22:31 23 A. I wouldn't say that. I do think it
14:22:33 24 is in those materials. But we came to a
14:22:35 25 qualitative conclusion looking at the company's

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14:22:37 1 choices. Like I said, I don't recall everything
14:22:40 2 that we did. Same answer.

14:22:44 3 Q. Okay. And I think you forecast
14:23:01 4 this, Doctor, but I am going to show you the
14:23:08 5 Xstrata 2011 annual report.

14:23:12 6 A. Okay.

14:23:12 7 (Exhibit Number 1165
14:23:12 8 marked for identification.)

14:23:12 9 BY MR. BEDNAR:

14:23:18 10 Q. That is Exhibit 1165. A smiling
14:23:23 11 person on the cover. And I'm going to take you
14:23:25 12 to Page 117 of the PDF, which is in the
14:23:38 13 remuneration section of the report. And it
14:23:39 14 describes Xstrata's use of a comparator index
14:23:49 15 under performance conditions.

14:23:52 16 And there the comparator index also
14:23:55 17 has Rio Tinto, right?

14:23:58 18 A. Yes, both companies appear just like
14:23:59 19 the other.

14:24:00 20 Q. And have Teck Resources?

14:24:03 21 A. It does.

14:24:07 22 MR. KIRSCH: Tom, I'm sorry. What
14:24:09 23 page are you on again?

14:24:10 24 MR. BEDNAR: I was on Page 117 of
14:24:12 25 the PDF, which is 101 of the report, I'm

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14:24:15 1 sorry.

14:24:16 2 MR. KIRSCH: 101. That is okay.

14:24:18 3 Thank you.

14:24:34 4 BY MR. BEDNAR:

14:24:43 5 Q. I'm going to ask you about Vale.

14:24:47 6 Now, you obviously considered Vale to be a useful
14:24:50 7 comparator for Rio Tinto, right?

14:24:51 8 A. Yes.

14:24:52 9 Q. Vale is one of the largest iron ore
14:25:00 10 miners in the world, right?

14:25:02 11 A. Yes.

14:25:02 12 Q. Let me actually switch gears and ask
14:25:42 13 you about Barrick Gold. Barrick Gold was in the
14:26:09 14 eight company comparator index that you used in
14:26:12 15 your event study, right?

14:26:13 16 A. Yes, sir.

14:26:17 17 Q. And, what if anything did you do to
14:26:20 18 analyze whether the product mix of Barrick Gold
14:26:24 19 is sufficiently comparable with the product mix
14:26:28 20 of Rio Tinto to serve as a useful comparator for
14:26:35 21 the event study?

14:26:36 22 A. Again, I don't really recall what we
14:26:39 23 found when we looked at the annual report. But,
14:26:41 24 I don't recall. Same answer as before.

14:26:44 25 Q. And is there anything that would

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14:26:47 1 refresh your memory on that?

14:26:50 2 A. No.

14:26:58 3 Q. If you reached any conclusions about
14:27:02 4 the comparability of the product mix between the
14:27:05 5 two companies, would it be listed in your report
14:27:07 6 or the exhibits in appendices?

14:27:11 7 A. It should be. It could also be a
14:27:14 8 qualitative judgment. It should be, yes.

14:27:16 9 Q. Well, if there is a qualitative
14:27:19 10 adjustment to be reflected, would that be written
14:27:22 11 down in any way in your report?

14:27:23 12 A. It should be, yes. That is what I'm
14:27:25 13 saying.

14:27:26 14 Q. But as you sit here right now, you
14:27:28 15 don't recall whether such analysis was done?

14:27:32 16 A. Well, I recall the analysis. I'm
14:27:35 17 just not recalling the particulars of it.

14:27:42 18 Q. And Barrick Gold, at the time in
14:27:47 19 2011, was the largest gold company, right?

14:27:50 20 And Newmont, another company that
14:27:53 21 was in your eight firm comparator index, that was
14:27:57 22 another of the world's very large gold companies,
14:28:00 23 right?

14:28:00 24 A. That is certainly true.

14:28:02 25 Q. Would you describe either of those

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14:28:07 1 as diversified mining company?

14:28:10 2 A. I really don't recall what other
14:28:13 3 lines of business are.

14:28:19 4 Q. Is it important to be diversified to
14:28:21 5 be useful comparators to Rio Tinto for an event
14:28:23 6 study?

14:28:23 7 A. That wasn't the point I made
14:28:25 8 earlier. I said the document said inadvertently
14:28:29 9 excluded all large diversified companies, and I
14:28:31 10 think that is important.

14:28:32 11 The company may also have viewed
14:28:34 12 other companies as worthy competitors.

14:28:35 13 So this justification is not the
14:28:37 14 only element. I just don't recall what lines of
14:28:40 15 business they're in.

14:28:40 16 Q. And I'm asking you to be a useful
14:28:43 17 comparator for purposes of an event study on Rio
14:28:46 18 Tinto, is it important that the companies in that
14:28:49 19 index be diversified?

14:28:54 20 A. I don't know what important means.
14:28:58 21 I mean I assume that you want companies as
14:29:03 22 similar to Rio Tinto as possible. But the
14:29:04 23 company may have viewed their other businesses
14:29:06 24 are sufficiently correlated with it to be worthy
14:29:08 25 of comparison.

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14:29:09 1 So, again, I don't recall all of the
14:29:11 2 various lines of Barrick or Newmont.

14:29:16 3 MR. KIRSCH: Tom, we have been going
14:29:19 4 about an hour and 20 minutes. And when you
14:29:21 5 get to the end of this line, let's take a
14:29:23 6 break, please.

14:29:26 7 MR. BEDNAR: We can break now. That
14:29:27 8 is fine.

14:29:28 9 Can you take us off the record?

14:29:29 10 THE VIDEOGRAPHER: We are going off
14:29:31 11 the record. The time is 2:29 eastern.

14:29:35 12 (Recess taken -- 2:29 p.m.)

14:45:39 13 (After recess -- 2:45 p.m.)

14:45:39 14 THE VIDEOGRAPHER: We are going back
14:45:50 15 on the record. The time is 2:45 eastern.

14:45:56 16 BY MR. BEDNAR:

14:46:05 17 Q. Dr. Hubbard, I want to ask you a few
14:46:10 18 questions about the April 8, 2011, acquisition of
14:46:17 19 Riversdale by Rio Tinto.

14:46:21 20 So, it is your opinion that the
14:46:30 21 market had viewed it as that Rio Tinto would
14:47:26 22 acquire control prior to April 8, 2011.

14:47:26 23 So, Dr. Hubbard, am I correct that
14:47:29 24 your opinion is that the market had an
14:47:33 25 expectation prior to April 8, 2011, that Rio

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14:47:39 1 Tinto would obtain control of Riversdale?

14:47:43 2 A. Yes, that is my opinion I have on
14:47:51 3 that subject.

14:47:52 4 Q. Did you reach any opinion as to
14:47:54 5 whether the market had an expectation of whether
14:47:56 6 Rio Tinto would gain control of Riversdale
14:47:58 7 without having to make concessions to the CSN or
14:48:05 8 Tata Steel companies?

14:48:09 9 MR. KIRSCH: Objection, vague.

14:48:10 10 THE WITNESS: I'm not sure what you
14:48:16 11 asked. If I am understanding your question,
14:48:17 12 no. It wouldn't have been doable, so no.

14:48:25 13 BY MR. BEDNAR:

14:48:26 14 Q. Did you come across any analyst's
14:48:28 15 coverage or news coverage prior to April 8, 2011,
14:48:32 16 predicting that Rio Tinto would acquire control
14:48:37 17 without having to make concessions to CSN or
14:48:41 18 Tata?

14:48:41 19 MR. KIRSCH: Objection as to what
14:48:43 20 concessions means in this context.

14:48:47 21 BY MR. BEDNAR:

14:48:48 22 Q. Well, let me ask you this:

14:48:49 23 So, CSN and Tata were the two
14:48:52 24 largest shareholders of Riversdale besides Rio
14:48:55 25 Tinto in April of 2011?

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14:48:57 1 A. Yes.

14:48:58 2 Q. And, I'm sorry, I didn't mean to cut
14:49:00 3 you off. And both CSN and Tata were steelmaking
14:49:06 4 companies, right?

14:49:07 5 A. Correct.

14:49:08 6 Q. And, fair to say that their interest
14:49:10 7 in Riversdale was primarily driven by their
14:49:16 8 interest in acquiring access to metallurgical
14:49:20 9 coal that could be used in their steelmaking
14:49:22 10 operations?

14:49:22 11 A. Yes. That was certainly a factor.

14:49:25 12 Q. And in conducting your event study
14:49:30 13 did you see any news coverage expressing the view
14:49:35 14 that Rio Tinto might have to enter into favorable
14:49:40 15 contracts to supply metallurgical coal to CSN or
14:49:46 16 Tata as a condition of obtaining shares from CSN
14:49:50 17 or Tata?

14:49:52 18 A. If I understand the question, I
14:49:54 19 don't recall one way or the other. I have all of
14:49:56 20 the news articles that I was able to retrieve.
14:49:59 21 They are all in the report.

14:50:00 22 Q. Okay. So, is it fair to say that
14:50:09 23 within the article cited in your report or the
14:50:12 24 appendices to your report, if there are articles
14:50:16 25 regarding the issue of CSN or Tata seeking

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14:50:18 1 concessions from Rio Tinto, that that is
14:50:21 2 something you would have considered, right?

14:50:25 3 A. Well, those articles should be
14:50:26 4 there. I don't think it is -- I don't know what
14:50:28 5 you mean by considered. It wouldn't really
14:50:31 6 affect my conclusion.

14:50:32 7 But, yes, the articles should be in
14:50:35 8 there if they exist.

14:50:35 9 (Whereupon, previously marked
14:50:35 10 Exhibit 445, first referral.)

14:50:43 11 BY MR. BEDNAR:

14:50:43 12 Q. I'm going to show you an exhibit
14:51:03 13 that is marked Plaintiff's Exhibit 445.
14:51:11 14 Exhibit 445 is notes of an interview of defendant
14:51:14 15 Guy Elliot from March 2013 created by two
14:51:20 16 employees of Rio Tinto.

14:51:22 17 Have you ever seen this exhibit
14:51:24 18 before today?

14:51:25 19 A. No. It looks to be an internal
14:51:28 20 document and for studying what the market wants.

14:51:40 21 Q. I'll take you to the second page of
14:51:44 22 that exhibit. A little more than halfway down
14:51:47 23 the page there is a paragraph in which Mr. Elliot
14:51:49 24 is described as saying, "Success was ultimately
14:51:54 25 growth and getting the deal done. It was

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14:51:56 1 generally thought that the bid tactics were well
14:52:00 2 done.

14:52:00 3 "The two major shareholders had
14:52:02 4 tried to secure better JV or supply contract
14:52:05 5 terms, but eventually just surrendered their
14:52:07 6 shares like everyone else."

14:52:09 7 Do you see that?

14:52:10 8 A. Yes.

14:52:12 9 MR. KIRSCH: I know you said you
14:52:13 10 haven't seen this before. If it would be
14:52:15 11 helpful for you to read the document, feel
14:52:17 12 free to do that before you answer any
14:52:19 13 questions.

14:52:21 14 THE WITNESS: No. I mean, it is
14:52:22 15 just that I was talking -- my report is about
14:52:25 16 what market participants saw. This is an
14:52:28 17 internal document and an interview of
14:52:32 18 someone's perspective. But, please feel free
14:52:34 19 to ask me anything you wish.

14:52:45 20 BY MR. BEDNAR:

14:52:45 21 Q. So, did you come across any news in
14:52:47 22 preparing your event study that would contradict
14:52:49 23 this statement that CSN and Tata tried to secure
14:52:54 24 better JV or supply contract terms?

14:52:59 25 A. I think you asked that question

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14:53:01 1 before. Same answer. I don't recall any of the
14:53:03 2 news articles I found that would be in there.

14:53:05 3 They are of course news to the
14:53:09 4 public, not necessarily what an internal person
14:53:12 5 they know.

14:53:12 6 But, if it is real news and it is in
14:53:14 7 the news outlet, I should know.

14:53:14 8 (Exhibit Number 1215
14:53:14 9 marked for identification.)

14:53:18 10 BY MR. BEDNAR:

14:53:18 11 Q. So, this is Exhibit 1215. It is an
14:53:21 12 article dated April 8, 2011 in the Financial
14:53:25 13 Review.

14:53:25 14 Do you see that?

14:53:26 15 A. I do.

14:53:28 16 Q. This is an article that is cited in
14:53:30 17 your report.

14:53:31 18 A. Okay.

14:53:32 19 Q. The Financial Review, is that a
14:53:34 20 major business publication in Australia?

14:53:36 21 A. It is.

14:53:37 22 Q. Towards the bottom of the page, the
14:53:54 23 paragraph reading CSN -- starts with CSN.

14:53:59 24 "Financial Review notes that CSN has
14:54:02 25 no off-take agreements with Riversdale and has

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14:54:06 1 been seen as a likely seller of its 19.9 percent
14:54:11 2 stake, but the company has indicated that it has
14:54:14 3 no immediate plans to sell and will likely hang
14:54:17 4 on until it can secure the 300,000 tons to
14:54:21 5 400,000 tons a year of coking coal it requires to
14:54:24 6 feed its Brazilian steelmaking operations."

14:54:28 7 Do you see that?

14:54:29 8 A. I do.

14:54:29 9 (Exhibit Number 1148
14:54:29 10 marked for identification.)

14:54:29 11 BY MR. BEDNAR:

14:54:29 12 Q. And then I will take you to
14:54:44 13 Exhibit 1148. This is an analyst report released
14:54:55 14 by Dolmen Daily, dated April 8, 2011.

14:54:58 15 Do you see that?

14:54:59 16 A. I do.

14:55:00 17 Q. And you discuss that report in your
14:55:04 18 report, right?

14:55:05 19 A. I believe so, yes.

14:55:06 20 Q. And let me take that down for a
14:55:15 21 moment just so I can pull you up to the correct
14:55:18 22 page.

14:55:26 23 And it is on Page 1 of Exhibit 1148.
14:55:32 24 The box in the middle where it says Rio Tinto
14:55:41 25 buy. And, fair to say that that paragraph

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14:55:44 1 describes the Rio Tinto acquisition of
14:55:51 2 Riversdale. Right?

14:55:52 3 A. Yes, sir.

14:55:54 4 MR. KIRSCH: You can read the
14:55:55 5 paragraph, Glenn, of course, before you
14:55:59 6 answer the questions.

14:56:00 7 BY MR. BEDNAR:

14:56:01 8 Q. Take your time.

14:56:02 9 A. It is fine.

14:56:04 10 Q. Towards the middle of the paragraph,
14:56:07 11 Dolmen says, "We viewed today's news of Rio
14:56:11 12 Tinto's majority stake as a positive of the
14:56:13 13 diversified miner."

14:56:14 14 Do you see that, right?

14:56:15 15 A. Yes.

14:56:16 16 Q. And I want to ask you about the next
14:56:18 17 sentence which says, "Also, the manner in which
14:56:20 18 Rio gained control of Riversdale is an added
14:56:25 19 bonus as it increased its stake without defense
14:56:30 20 from other shareholders." Do you see that?

14:56:32 21 A. I see that.

14:56:33 22 Q. So, would you agree that on
14:56:34 23 April 8, 2011, the manner in which Rio Tinto
14:56:37 24 gained control of Riversdale without having to
14:56:40 25 buy shares from CSN and Tata, that was news that

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14:56:45 1 day. Correct?

14:56:46 2 MR. KIRSCH: Objection.

14:56:47 3 THE WITNESS: I don't think so. I
14:56:50 4 see this is that analyst's view. I don't
14:56:53 5 know whether the analyst changed price
14:56:55 6 targets or anything else as a result of this
14:56:56 7 news. I don't recall.

14:56:57 8 But, you can't make the leap you
14:56:59 9 just made, if that is your question.

14:57:00 10 BY MR. BEDNAR:

14:57:05 11 Q. Did you -- let me ask you a new
14:57:10 12 question.

14:57:10 13 In the work that you did in
14:57:20 14 preparing your report, were you able to reach a
14:57:26 15 conclusion one way or the other as to whether the
14:57:29 16 fact that Rio Tinto gained control without buying
14:57:32 17 shares from CSN or Tata had been forecast prior
14:57:40 18 to April 8th?

14:57:45 19 MR. KIRSCH: Objection.

14:57:46 20 THE WITNESS: I don't recall
14:57:46 21 studying that particular point. I'm
14:57:48 22 certainly not sure why I would, but I don't
14:57:53 23 recall that, no.

14:57:53 24 BY MR. BEDNAR:

14:57:54 25 Q. And so the news reports that you did

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14:57:56 1 cite -- and I will take this down. I don't have
14:57:58 2 other questions about this right now.

14:57:59 3 The news articles that you did look
14:58:02 4 at, were those the result of some sort of
14:58:07 5 systematic search of databases?

14:58:10 6 A. Yes. Where I do news by the
14:58:13 7 analysts in each case there, are searches either
14:58:16 8 of universes or key words. Very different from
14:58:22 9 Dr. Metz.

14:58:22 10 Q. Okay. And the searches that you ran
14:58:26 11 across the Factiva database produced many of the
14:58:30 12 news articles that are cited in your Appendix B,
14:58:36 13 is that right?

14:58:37 14 A. Yes, sir.

14:58:37 15 Q. And would you agree with me that
14:58:40 16 your systematic search of Factiva, that began on
14:58:44 17 March 28th, right?

14:58:45 18 A. I don't recall the exact date. Do I
14:58:47 19 need to know for this question?

14:58:51 20 Q. Well, I'm asking if that was your
14:58:53 21 methodology.

14:58:57 22 Do you know where that would be
14:58:59 23 described in your report?

14:59:00 24 A. No, that would take a little while.
14:59:01 25 If this is important --

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14:59:14 1 Q. If I can direct you, I will pull it
14:59:16 2 up on the screen.

14:59:17 3 A. Okay.

14:59:18 4 Q. Your report, which is Exhibit 224.
14:59:20 5 I will pull it up for you. It is Page 29 of the
14:59:24 6 PDF.

14:59:25 7 A. Okay. That is what I was looking
14:59:27 8 for, yes.

14:59:27 9 Q. Yes. Footnote 121.

14:59:31 10 A. Yes.

14:59:31 11 Q. Do you agree with me that
14:59:34 12 Footnote 121, does that describe the methodology
14:59:37 13 that you and your team applied to search for news
14:59:40 14 within Factiva?

14:59:41 15 A. Yes, sir, that does.

14:59:47 16 Q. And your search applied search terms
14:59:51 17 to Factiva for different periods beginning
14:59:55 18 March 28th, correct?

14:59:56 19 A. That's correct.

14:59:56 20 Q. Okay. And, so did your team apply
15:00:02 21 any systematic searches of Factiva for periods of
15:00:08 22 time before March 28th?

15:00:13 23 A. For this purpose no. We have a
15:00:17 24 timeline that goes back to the beginning. But,
15:00:19 25 no, not for this purpose.

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15:00:21 1 Q. Okay. Dr. Hubbard you are familiar
15:00:40 2 with the term, control premium, right?

15:00:42 3 A. Yes.

15:00:43 4 Q. In the context of mergers and
15:00:45 5 acquisitions, what is a control premium?

15:00:48 6 A. Well, it is actually a good
15:00:51 7 question. Sometimes people just refer to it as
15:00:55 8 just a premium from taking over the company that
15:00:59 9 can enable you to change strategy. Maybe it
15:01:03 10 would be within the products of control.
15:01:05 11 Sometimes that gets conflated in discussions with
15:01:08 12 synergies that can also account for premium in a
15:01:12 13 transaction.

15:01:13 14 But, some people use the word,
15:01:17 15 control premium, to cover all of the above.

15:01:23 16 Q. Do you have a definition that you
15:01:24 17 view as correct?

15:01:29 18 A. Well, control premium depends on
15:01:32 19 different countries, different times. It depends
15:01:36 20 on what you mean by control.

15:01:38 21 If it means private benefits of
15:01:40 22 control, that is very different from changing
15:01:43 23 strategy. And I think changing strategy is being
15:01:46 24 lumped into synergies and other things.

15:01:48 25 Q. Okay. So, when you talk about the

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15:01:50 1 private benefits of control in connection with
15:01:52 2 the control premium, what do you mean?

15:01:54 3 A. In other words that I may pay for an
15:01:59 4 asset in order to get private benefits of control
15:02:02 5 dissipated from my own personal purposes as the
15:02:05 6 leader or to be inefficient in how I run things.

15:02:09 7 Q. Okay. And then synergies, what does
15:02:17 8 synergies mean in this context?

15:02:19 9 A. Synergy would mean a gain from the
15:02:21 10 combination of two firms. And of course to the
15:02:23 11 extent that one pays more than the market price
15:02:26 12 for something, it must be a belief that it is
15:02:29 13 worth more in the hands of the buyer.

15:02:31 14 And the question is why use that.
15:02:34 15 Often people argue for synergies, and thus
15:02:38 16 economists think most, if not all, synergies wind
15:02:41 17 up being captured by the target rather than the
15:02:47 18 goal.

15:02:54 19 Q. You say most economists are of the
15:02:56 20 view that -- did you say synergies are most, if
15:03:01 21 not all, value from synergies is captured by the
15:03:05 22 target. Is that what you said?

15:03:06 23 A. Yes, those are empirical studies
15:03:09 24 that -- it is often an expression that
15:03:12 25 managements often overpay or barely cover what an

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15:03:17 1 asset is. That comes from a literature in
15:03:21 2 finance going back some decade.

15:03:22 3 Q. Is that your view?

15:03:24 4 A. It depends on the -- it depends on
15:03:26 5 the company that is the physical evidence. You
15:03:31 6 know, studies like Andrade, Mitchell and Stafford
15:03:37 7 would define that. Other statistical studies
15:03:39 8 going all of the way back to Paul Aspit's work in
15:03:43 9 the 1980's on that.

15:03:44 10 That is probably a pretty general
15:03:48 11 deal, but obviously any given deal is its own
15:03:52 12 deal.

15:03:52 13 Q. So, your view on whether the
15:03:57 14 acquiring firm can capture any of the value of
15:04:01 15 synergies, does that depend on the specific facts
15:04:06 16 of each instance?

15:04:08 17 A. My view on that subject is
15:04:11 18 irrelevant to this case.

15:04:13 19 So I'm not sure -- I don't really
15:04:18 20 need -- it has nothing to do with what I did in
15:04:21 21 this case. And I have already told you my view
15:04:23 22 of your own experts. So, I told you what my view
15:04:27 23 is. It is just not germane to this case.

15:04:30 24 Q. No, I think you told me what the
15:04:32 25 views of several economists that had published

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15:04:35 1 articles is.

15:04:35 2 What is your view as to whether the
15:04:37 3 acquiring firm can capture value from synergies?

15:04:44 4 MR. KIRSCH: Objection. I thought I
15:04:46 5 did hear his answer, but please go ahead and
15:04:49 6 answer again.

15:04:49 7 THE WITNESS: I answered that, but I
15:04:50 8 will answer it again. I said two things.
15:04:52 9 One is that every deal is its own deal. You
15:04:55 10 can't necessarily think that every deal is
15:04:57 11 the same. But the economic literature is
15:04:59 12 pretty clear, that not most of the gains go
15:05:02 13 to the target.

15:05:03 14 But, obviously there are going to be
15:05:06 15 deals that are the exception.

15:05:10 16 BY MR. BEDNAR:

15:05:11 17 Q. You also referred to control premium
15:05:12 18 being associated with the change in strategy.

15:05:14 19 What did you mean by that?

15:05:17 20 A. Well, there was one thing -- one
15:05:19 21 reason I might be able to or willing to pay more
15:05:22 22 for a company in its current market price is
15:05:27 23 there are assets that I think I could do
15:05:29 24 something different with and maybe increase
15:05:32 25 value.

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15:05:32 1 So, sometimes people group that
15:05:35 2 under control premium because I can't do that
15:05:37 3 until I wrest that out of the hands of somebody
15:05:39 4 else.

15:05:39 5 But, you could also think about it
15:05:41 6 as a synergy game. But that is -- you are trying
15:05:44 7 to explain why you would pay more for an asset
15:05:47 8 than its current market price.

15:06:01 9 Q. If a company pays a control premium
15:06:04 10 that is lower than the average premium paid for
15:06:11 11 acquisitions in its industry, does that provide
15:06:13 12 any information about whether the firm has
15:06:16 13 captured value from the acquisition?

15:06:23 14 A. If I am understanding your question,
15:06:26 15 I am not sure, because it depends on the facts
15:06:29 16 and circumstances of that time versus other
15:06:32 17 transactions. So, I'm not sure is my answer to
15:06:39 18 that.

15:06:46 19 Q. Would you agree that a control
15:06:48 20 premium that is particularly large relative to
15:06:51 21 other acquisitions in the industry may indicate
15:06:55 22 that the acquiring firm has failed to capture
15:06:58 23 value from the acquisition?

15:07:02 24 MR. KIRSCH: Objection, vague.

15:07:03 25 THE WITNESS: It depends. I mean

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15:07:07 1 there is an all else equal that you didn't
15:07:09 2 say in events when holding constant the time
15:07:13 3 period and everything else.

15:07:14 4 It could be that some acquirers are
15:07:17 5 just simply more talented integrating other
15:07:20 6 assets, and it could be that other acquirers
15:07:28 7 simply overpay.

15:07:28 8 (Exhibit Number 1210
15:07:28 9 marked for identification.)

15:07:28 10 BY MR. BEDNAR:

15:07:32 11 Q. I'm going to show you Exhibit 1210,
15:07:36 12 which is an expert report submitted in this case
15:07:39 13 written by Mr. Robert Edwards on behalf of the
15:07:42 14 defendants.

15:07:42 15 Have you seen this report before?

15:07:45 16 A. I have not.

15:07:56 17 Q. Taking you to Page 34 of the PDF,
15:08:03 18 which is Page 31 of the report.

15:08:11 19 Paragraph 77, Mr. Edwards writes
15:08:17 20 that, "Rio Tinto ultimately acquired a
15:08:21 21 controlling stake of Riversdale by offering
15:08:27 22 16 Australian dollars and \$0.50 per share, which
15:08:31 23 represented a 28 percent premium to the volume-
15:08:34 24 weighted average trading price of Riversdale's
15:08:38 25 shares during the month ending December 3rd, 2010,

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15:08:41 1 before the market learned about the negotiations
15:08:43 2 with Rio Tinto."

15:08:43 3 Did I read that correctly?

15:08:46 4 A. Yes.

15:08:48 5 Q. Did you do anything to estimate the
15:08:52 6 control premium that Rio Tinto paid in acquiring
15:08:55 7 Riversdale?

15:08:56 8 A. I think I refer to it in some of the
15:09:00 9 similar types of calculations in my report, but
15:09:03 10 it is obviously not a focus for me.

15:09:05 11 Q. Okay. Did your analysis conflict
15:09:10 12 with Mr. Edwards' calculation of the control
15:09:13 13 premium?

15:09:14 14 A. First time I'm seeing it. I don't
15:09:17 15 really recall the numbers but not to my
15:09:19 16 knowledge.

15:09:28 17 Q. And then I will take you to Page 36,
15:09:37 18 Paragraph 83. And then -- sorry. Paragraph 85,
15:09:46 19 at the bottom of the page, which carries over to
15:09:51 20 the next page.

15:09:51 21 Mr. Edwards writes that, "A number
15:09:53 22 of studies in different industries show that the
15:09:56 23 average control premium paid for publicly traded
15:09:59 24 companies are in the range of 25 to 50 percent of
15:10:03 25 the trading price of the associated shares on the

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15:10:06 1 dates before the initial offer is made."

15:10:11 2 Do you have any reason to doubt that
15:10:13 3 information provided by Mr. Edwards?

15:10:16 4 A. I don't know the context here.
15:10:19 5 Obviously there are things in the industry.

15:10:21 6 But, that range doesn't sound right
15:10:26 7 to me.

15:10:26 8 Q. And then the very next sentence of
15:10:28 9 Paragraph 85, Mr. Edwards concludes that, "In the
15:10:31 10 metals and mining sector the average premium paid
15:10:33 11 between 2006 and 2016 was estimated to be
15:10:36 12 35.8 percent."

15:10:37 13 Do you see that?

15:10:39 14 A. I see that.

15:10:40 15 Q. So, if Mr. Edwards is correct that
15:10:43 16 the average control premium is 35.8 percent in
15:10:47 17 the industry, during that time period, and Rio
15:10:51 18 Tinto paid a 28 percent control premium, Rio
15:10:54 19 Tinto's premium would have been substantially
15:10:56 20 below the industry average. Correct?

15:10:58 21 MR. KIRSCH: Objection.

15:11:00 22 THE WITNESS: I don't know where you
15:11:02 23 are headed with this, but I can't say that
15:11:03 24 because I don't know. I would want to weight
15:11:06 25 it toward the middle of the time period when

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15:11:09 1 the actual contract was to compare them at a
15:11:12 2 point in time.

15:11:12 3 But, we are certainly in the range.

15:11:15 4 I don't know one way or the other. Sounds
15:11:16 5 like a good question for you to ask

15:11:20 6 Mr. Edwards.

15:11:20 7 BY MR. BEDNAR:

15:11:20 8 Q. Okay. And so, if you were to try
15:11:22 9 and compare Rio Tinto's control premium that it
15:11:24 10 paid for Riversdale, what would be a useful way
15:11:28 11 for you to compare that to an industry average?

15:11:31 12 A. I think I did offer some comparisons
15:11:35 13 in the report, I don't remember. If this is
15:11:37 14 important, maybe you should find it. Or, if not,
15:11:40 15 I can give you a quicker answer.

15:11:42 16 Q. For present purposes I would like
15:11:45 17 you to just say what you would do to compare it
15:11:50 18 to the industry average.

15:11:51 19 A. Well, you would try to look at
15:11:53 20 transactions that are, you know, close in time.
15:11:55 21 It could be the premium used to be a lot higher
15:11:59 22 or lower years ago than they are right now.

15:12:01 23 I have no reason to believe that
15:12:02 24 that is a problem for him here. I haven't seen
15:12:05 25 this report. Again, for that question I think

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15:12:09 1 you should ask him.

15:12:09 2 (Exhibit Number 1118

15:12:09 3 marked for identification.)

15:12:09 4 BY MR. BEDNAR:

15:12:45 5 Q. I want to put up Exhibit 1118, which
15:12:48 6 is Exhibit 7 to your report.

15:13:17 7 Do you have that in front of you,
15:13:19 8 Doctor?

15:13:19 9 A. I do.

15:13:24 10 Q. The probabilities in Column B, did
15:13:25 11 you derive those probabilities as a result of any
15:13:29 12 calculation?

15:13:30 13 A. I think you could surmise that I
15:13:32 14 didn't because they are clearly just rising by
15:13:36 15 10 percent. It just presents a tableau and you
15:13:40 16 can find wherever you want to be.

15:13:43 17 Q. And, did you follow any standard
15:13:54 18 from peer-reviewed academic literature for
15:13:58 19 assessing the probability of Rio Tinto gaining
15:14:01 20 control on April 7, 2011?

15:14:09 21 MR. KIRSCH: Objection.

15:14:10 22 THE WITNESS: That is not necessary
15:14:11 23 here. This is taking Dr. Metz's point
15:14:13 24 estimate, converting it to dollars. And then
15:14:16 25 saying depending on what you believe the

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15:14:20 1 probability of control would be -- of taking
15:14:22 2 control would be, what the implied change in
15:14:24 3 market value is.

15:14:26 4 As you can tell they are all silly.
15:14:29 5 They go from silly to crazy.

15:14:40 6 BY MR. BEDNAR:

15:14:40 7 Q. And are you expressing an opinion on
15:14:42 8 what a correct percentage probability is?

15:14:48 9 A. Well, I think we could agree it is
15:14:50 10 between 0 and 100. All of the numbers here were
15:14:55 11 crazy. That is about all I can say. It is a
15:14:58 12 head scratcher, again, Dr. Metz's report.

15:15:02 13 Q. So, you are not expressing an
15:15:04 14 opinion on what a correct probability is, other
15:15:06 15 than the range 0 to 100?

15:15:09 16 A. That's correct. I don't need to
15:15:11 17 illustrate the silliness that is on this study.

15:15:23 18 Q. Where you list assumed probability
15:15:29 19 of Rio Tinto gaining control on April 7, 2011, is
15:15:35 20 the concept that you are expressing there simply
15:15:38 21 the probability of Rio Tinto gaining control at
15:15:40 22 all?

15:15:42 23 A. Well, no, I think it is more
15:15:47 24 specific. Let's go back to what this is about.

15:15:49 25 So, Dr. Metz produces a point

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15:15:53 1 estimate. He says wow, it is increasing, it is
15:15:57 2 3 percent. So, we can calculate what that is in
15:15:59 3 dollars.

15:16:00 4 Then it depends well, if he really
15:16:01 5 didn't think there was any chance of gaining
15:16:04 6 control, then his point estimate he, not me, is
15:16:09 7 called that, the control gain for the company,
15:16:12 8 that would be \$4.2 billion.

15:16:14 9 If you think that, well, people are
15:16:17 10 already thinking they get control anyway, the
15:16:20 11 implied value is very large fast.

15:16:22 12 Even if you want to make it 0, these
15:16:24 13 numbers are just crazy.

15:16:26 14 Q. Does column --

15:16:27 15 A. It is another way of saying his
15:16:29 16 point estimate is crazy.

15:16:31 17 Q. Column C, does that represent the
15:16:35 18 value of Riversdale to Rio or the value of
15:16:38 19 control?

15:16:40 20 A. Well, Dr. Metz would call it the
15:16:42 21 same thing. So what Dr. Metz says his point
15:16:45 22 estimate is doing is telling you that is the gain
15:16:49 23 from control, Dr. Metz, not me -- Dr. Metz says
15:16:53 24 that is the gain from control for the Rio Tinto
15:16:56 25 shareholder.

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15:16:56 1 And that is a pretty good
15:16:58 2 transaction. Because if it went from 0 -- even
15:17:00 3 at 0 percent assumed probability, the value of
15:17:04 4 the company goes up by even more.

15:17:06 5 So, wow, that is pretty amazing.

15:17:08 6 And then if you go down to have
15:17:11 7 higher probabilities, the numbers get really
15:17:13 8 silly.

15:17:14 9 So, it is just a way of saying -- I
15:17:16 10 have told you before I don't think the exercise
15:17:17 11 is worth doing.

15:17:18 12 This is just saying any analyst
15:17:20 13 would have looked at this and think it was silly.

15:17:23 14 Q. Dr. Hubbard, did Dr. Metz create
15:17:26 15 Exhibit 7 or did you?

15:17:27 16 A. Dr. Metz. I just added the
15:17:30 17 [garbled] to it. His point estimate, converting
15:17:32 18 it to dollars and then showing you what it means.

15:17:35 19 It is Dr. Metz, not me, who said
15:17:37 20 this was all about estimating a gain from
15:17:39 21 control --

15:17:41 22 Q. Dr. Hubbard, the -- I'm sorry. Are
15:17:44 23 you finished?

15:17:45 24 A. No. I think if he had done that, he
15:17:47 25 would have realized how silly he was.

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15:17:49 1 Q. The exhibit that is in front of you,
15:17:52 2 who created that?

15:17:53 3 A. I created it. But, the input is
15:17:57 4 from Dr. Metz.

15:17:59 5 Q. The column, Column C, which is
15:18:02 6 titled total value of control, does that
15:18:05 7 represent the value of Riversdale to Rio Tinto or
15:18:09 8 the value of control? Or are they the same
15:18:13 9 thing?

15:18:13 10 A. Excellent question. It is a good
15:18:16 11 one for Dr. Metz because he confuses all of it.
15:18:20 12 What he says, which is what I am holding him to,
15:18:23 13 is that that is the gain from control.

15:18:25 14 And so I take his point estimate,
15:18:28 15 which he claims is reasonable, and just convert
15:18:30 16 it to dollars. That is all I have done.

15:18:33 17 Q. And I'm asking you for the purposes
15:18:41 18 of this exhibit which you compiled, is the gain
15:18:45 19 from control the same as the value of Riversdale?

15:18:51 20 MR. KIRSCH: Objection, asked and
15:18:52 21 answered. Several different times.

15:18:54 22 Go ahead, Glenn.

15:18:56 23 THE WITNESS: It is hard because
15:18:59 24 Dr. Metz is confused -- his writing is
15:19:01 25 confused, I should say.

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15:19:03 1 There is a question about whether
15:19:05 2 buying Riversdale is accreted. And there is
15:19:09 3 also a question about whether this
15:19:11 4 incremental news at the end tells you
15:19:14 5 something. Because, it is the value of
15:19:16 6 control. We have already been in this game.
15:19:19 7 I am trying to buy the company. Now I
15:19:19 8 finally get it.

15:19:21 9 The only purpose of Exhibit 7 is to
15:19:23 10 say if you believe that, you will get numbers
15:19:26 11 that are wildly implausible, which probably
15:19:28 12 tells you, you did something wrong.

15:19:30 13 BY MR. BEDNAR:

15:19:30 14 Q. And do those numbers represent the
15:19:32 15 value of gaining control of Riversdale or the
15:19:35 16 value of the entire asset?

15:19:38 17 A. I am going with Dr. Metz. Dr. Metz
15:19:42 18 says they reflect the value of control. That is
15:19:44 19 what he says his point estimate is, along with
15:19:48 20 converting with the dollar.

15:19:50 21 Q. And you are saying that they
15:19:52 22 represent the incremental value of gaining
15:19:54 23 control or the value of the entire asset once
15:19:57 24 control is gained?

15:19:58 25 A. The former is what Dr. Metz says.

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15:20:01 1 Again, I think this is all silly --

15:20:11 2 Q. If you look at the line for
15:20:30 3 50 percent. If the abnormal increase upon
15:20:39 4 obtaining control with the probability of
15:20:42 5 50 percent is 4.233 billion, how is it that the
15:20:49 6 total value of control is twice that amount?

15:20:55 7 A. If we think about the experiment,
15:21:00 8 the point estimate Dr. Metz is tendering is his
15:21:04 9 estimate of the value of control.

15:21:06 10 Now, we know that the market adds
15:21:10 11 some probability before the time, about the
15:21:14 12 likelihood of gaining control.

15:21:16 13 So, the most charitable framework to
15:21:21 14 Dr. Metz's calculation is you say suppose it is a
15:21:25 15 total surprise, then you would get a very big
15:21:28 16 number.

15:21:29 17 If you already thought it was sort
15:21:30 18 of likely, 50 percent, you get a much bigger.

15:21:33 19 Because, remember, he had already
15:21:34 20 baked 50 percent into the price.

15:21:38 21 It is just the way of saying, given
15:21:40 22 his point estimate, given that the market saw a
15:21:42 23 lot of this coming, you get numbers that don't
15:21:45 24 make any sense.

15:21:46 25 So, you probably want to go back and

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15:21:48 1 ask for that point estimate. That is the purpose
15:21:50 2 of the exhibit, that is all.

15:21:52 3 Q. We may come back to that, Doctor,
15:22:21 4 I'm going to take it down for now --

15:22:28 5 Actually before I do, what I'm
15:22:33 6 trying to ascertain is what is the interpretation
15:22:35 7 of Column C?

15:22:38 8 A. Just what it says. So, basically if
15:22:42 9 you believe Dr. -- two things from Dr. Metz.

15:22:45 10 One, that this coefficient he is
15:22:48 11 estimating is the gain from getting control.
15:22:52 12 And, second, that his point estimate is the right
15:22:55 13 estimate of that value.

15:22:57 14 Then one can convert to dollars and
15:23:00 15 answer these questions. So, that would be the
15:23:02 16 value of control implied by his analysis.

15:23:05 17 All I'm doing is using his point
15:23:08 18 estimate and his definition.

15:23:13 19 Q. Does Column C incorporate the cost
15:23:17 20 that Rio Tinto already had sunk into acquiring
15:23:20 21 the shares that it had?

15:23:22 22 A. No. But he is estimating, his
15:23:27 23 account, the incremental value. I think I do a
15:23:30 24 footnote somewhere in the report where I talk
15:23:33 25 about the original basis and then add this to it.

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15:23:55 1 Q. And when we talk about value of
15:23:57 2 control as represented in the exhibit that we
15:23:59 3 just had up, is that the value of controlling
15:24:03 4 Riversdale or the value of taking control on
15:24:08 5 April 8th?

15:24:09 6 A. Dr. Metz is defining it as the
15:24:12 7 latter. He is defining events that are the coup
15:24:18 8 de grace piece of information. And it tells us
15:24:20 9 we have this 3 percent return, abnormal return,
15:24:24 10 so it is definitely the latter, in his words.

15:24:26 11 I don't think any of this is right.

15:24:30 12 Q. And that is because of your
15:24:31 13 determination of what issues should be relevant
15:24:33 14 to the court. Is that correct?

15:24:35 15 MR. KIRSCH: Objection, lack of
15:24:36 16 foundation.

15:24:37 17 THE WITNESS: It is not -- this
15:24:39 18 question isn't even an answer to the question
15:24:41 19 about accretion. And even if it were an
15:24:44 20 answer to the question about accretion, that
15:24:47 21 question has no bearing on the ultimate
15:24:49 22 impairment. So, it is doubly useless, if
15:24:52 23 that answers your question.

15:25:12 24 BY MR. BEDNAR:

15:25:12 25 Q. Dr. Hubbard, is it your opinion that

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15:25:15 1 asset impairments are never relevant to a
15:25:18 2 company's stock price?

15:25:21 3 A. Big changes -- we are moving on,
15:25:27 4 right? This is the --

15:25:28 5 Q. We sure are.

15:25:30 6 A. Okay. No, that is certainly not
15:25:35 7 true.

15:25:35 8 Q. In what circumstances can asset
15:25:38 9 impairments be relevant to a company's stock
15:25:41 10 price?

15:25:42 11 A. Well, if they happen to be
15:25:45 12 unanticipated, important, and revealing strategic
15:25:51 13 errors, there is a number of things. You could
15:25:55 14 ask me facts and circumstances questions.

15:25:56 15 But, you know, it is possible.

15:26:04 16 Q. You referred to an impairment being
15:26:10 17 important. What factors would make an impairment
15:26:13 18 important to a company's stock price?

15:26:19 19 A. Well, it would have to be large. It
15:26:22 20 would have to be unanticipated, possibly
15:26:25 21 signalling other issues inside the firm.

15:26:28 22 An impairment that is very small, it
15:26:33 23 may not move the needle. Or one where the market
15:26:35 24 has already figured it out may not move the
15:26:37 25 needle.

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15:26:37 1 The actual impairment is an
15:26:39 2 accounting piece of information, a disclosure.
15:26:42 3 But, the market may have already known it.

15:26:46 4 Q. Is there a difference between
15:27:06 5 writing down an asset value and discounting the
15:27:09 6 company's future earnings?

15:27:12 7 A. There may be or may not be.

15:27:25 8 Q. And what would determine the
15:27:27 9 difference?

15:27:28 10 A. Facts and circumstances.

15:27:34 11 Q. What kind of facts and
15:27:36 12 circumstances?

15:27:37 13 A. The time pattern of the cash flows,
15:27:40 14 the time pattern of the investment.

15:27:53 15 Q. Is it your opinion that the
15:27:56 16 impairment of Riversdale, the first impairment in
15:28:00 17 January of 2013, was not a surprise to the
15:28:02 18 market?

15:28:04 19 A. I think that is my opinion, and more
15:28:10 20 importantly it is the view of the market
15:28:12 21 participants that I reviewed.

15:28:21 22 Q. In terms of determining whether
15:28:23 23 market participants are surprised, are you
15:28:25 24 talking about looking at analysts' reports?

15:28:26 25 A. Yes, sir.

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15:28:28 1 Q. Is there any sort of standard
15:28:32 2 methodology for ascertaining whether analysts'
15:28:36 3 reports expressed surprise at the news?

15:28:39 4 A. It was their own commentary. It was
15:28:44 5 whether they changed quantitative metrics of the
15:28:46 6 price target or earnings per share.

15:28:54 7 Q. And your opinion is that the market
15:28:56 8 was not surprised by the impairment.

15:29:04 9 Is that because you concluded that
15:29:06 10 specific risks associated with Riversdale were
15:29:09 11 known to the market?

15:29:12 12 A. Well, that was certainly part of it,
15:29:16 13 but I need more.

15:29:21 14 Q. You think that one of the things you
15:29:24 15 identify in your report is sovereign risk related
15:29:27 16 to Mozambique. Is that right?

15:29:29 17 A. Yes. But those were things that
15:29:31 18 were present at the beginning of the transaction.

15:29:33 19 So, when I mean more, those are
15:29:36 20 risks that may or may not materialize.

15:29:38 21 But over time the market may come to
15:29:41 22 form a view about the timeliness of the assets
15:29:44 23 completion, its future cash flows, infrastructure
15:29:44 24 and so on.

15:29:49 25 I think of more than just the

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15:29:50 1 initial risks of the project.

15:30:12 2 Q. So, what specific information was
15:30:15 3 known within the market that in your view caused
15:30:18 4 the market to anticipate the impairment?

15:30:22 5 A. I have an entire very lengthy
15:30:25 6 appendix on this, going analyst by analyst, with
15:30:30 7 news about what reviews were, unimpairment in the
15:30:35 8 asset, what the changes, if any, were on price
15:30:38 9 targets or pre and post impairment value rates.

15:30:44 10 Q. One of the things that you mention
15:30:45 11 in your report is the fact that there was some
15:30:48 12 coverage of issues related to government approval
15:30:52 13 of barging permits. Do you remember that?

15:30:55 14 A. Yes.

15:30:57 15 Q. And, what role, if any, do you think
15:30:59 16 that that played in causing the market to
15:31:05 17 anticipate an impairment?

15:31:10 18 A. I can't give that a precise value.
15:31:13 19 It is among the things that analysts commented on.

15:31:25 20 Q. Is it your opinion that it was known
15:31:28 21 within the market that Rio Tinto could not barge
15:31:30 22 coal? Or do you have some different opinion as
15:31:32 23 to that issue?

15:31:33 24 MR. KIRSCH: Objection, lack of
15:31:34 25 foundation.

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15:31:35 1 THE WITNESS: The opinions I'm
15:31:38 2 stating are really summarizing the news of
15:31:41 3 the analysts and their effects on price
15:31:43 4 targets and earnings per share.

15:31:45 5 I am not reading the same
15:31:47 6 information and putting myself in.

15:31:56 7 BY MR. BEDNAR:

15:31:56 8 Q. Did you identify any analyst who
15:32:00 9 concluded that Rio Tinto could not barge coal on
15:32:02 10 the Zambezi River?

15:32:04 11 A. I really don't recall.

15:32:05 12 MR. KIRSCH: Are you asking at that
15:32:07 13 moment or ever?

15:32:09 14 BY MR. BEDNAR:

15:32:09 15 Q. Prior to January 17th, 2013?

15:32:14 16 A. No, I'm sorry, I'm asking you --

15:32:17 17 Q. Oh, sorry, yes. We will take them
15:32:20 18 one step at a time.

15:32:21 19 Did you identify any analyst who
15:32:24 20 stated an opinion that Rio Tinto would not ever
15:32:27 21 barge coal on the Zambezi River?

15:32:30 22 A. I don't recall the appendix, but I
15:32:35 23 believe it is B8 has all of my analysts'
15:32:39 24 commentary, but I don't recall the individual
15:32:41 25 statement.

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15:32:41 1 Q. So, any of the analysts' commentary
15:32:44 2 that you considered as relevant to your report
15:32:47 3 would be captured in that appendix, right?

15:32:49 4 A. Yes, because I actually had a
15:32:52 5 systematic method for accomplishing it.

15:32:56 6 Q. You also conducted an event study
15:33:23 7 related to certain Rio Tinto bonds for
15:33:26 8 January 17th, 2013. Is that right?

15:33:29 9 A. Yes, sir.

15:33:33 10 Q. And you noted in your report that if
15:33:35 11 you didn't find a statistically significant
15:33:38 12 abnormal return in the ADR event study, that you
15:33:42 13 wouldn't expect to find a return in a bond event
15:33:45 14 study, right?

15:33:46 15 A. Right, because equity is more
15:33:50 16 junior.

15:33:51 17 Q. I'm sorry. You said equity is more
15:33:54 18 what?

15:33:54 19 A. Junior. In other words, if equity
15:33:57 20 is not taking effect, you wouldn't expect it.
15:34:00 21 And I didn't find any change in credit rating.
15:34:03 22 So, I wouldn't expect to find it.

15:34:04 23 Q. Okay. Did you do a bond event study
15:34:08 24 with respect to any other dates besides
15:34:10 25 January 17th?

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15:34:12 1 A. No, not that I recall. Your
15:34:15 2 allegation related to that day so that is what I
15:34:19 3 did.

15:34:20 4 Q. If you conducted a bond event study
15:34:22 5 with respect to any other day, would it have been
15:34:24 6 produced in the supporting materials that came
15:34:26 7 into your report?

15:34:27 8 A. It would have been. But, I don't
15:34:29 9 recall doing one. There are many allegations
15:34:33 10 about many other days. I would do it, but this
15:34:36 11 one is your allegation.

15:34:39 12 Q. And, Doctor, I'm not asking you why
15:34:42 13 you did or didn't do anything. I'm just asking
15:34:44 14 you the basis of whether you did.

15:34:45 15 Did you, in conducting the
15:34:47 16 January 17th bond event study, did you determine
15:34:52 17 that the market for Rio Tinto bonds was
15:34:55 18 sufficient?

15:34:57 19 A. There are many of the factors
15:34:59 20 underlying equity market efficiency. The analyst
15:35:03 21 coverage and so on are there.

15:35:05 22 The large issues, trading for at
15:35:08 23 least some of the bonds occurred frequently.
15:35:12 24 Turnover was in the range.

15:35:14 25 I didn't do a specific study.

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15:35:23 1 Dr. Metz didn't challenge whether this market was
15:35:25 2 efficient. I just relied on those things. He
15:35:30 3 didn't challenge it.

15:35:31 4 Q. Okay. Earlier today when we were
15:35:34 5 talking about some basic principles for
15:35:38 6 conducting an event study, with respect to
15:35:40 7 determining market efficiency you talked about
15:35:42 8 liquidity.

15:35:43 9 Did you do anything to ascertain
15:35:45 10 liquidity in the market for the specific Rio
15:35:48 11 Tinto bond that you studied?

15:35:50 12 A. Well, it focused -- or I'm going
15:35:53 13 from memory, bonds.

15:35:55 14 I focus on eight that had more
15:36:00 15 frequent trading history. Corporate bonds in
15:36:03 16 general as a class, you know, don't trade as
15:36:06 17 often typically as large cap equities.

15:36:09 18 So I have focused only on a subset
15:36:13 19 of bonds. I looked at them individually. And
15:36:15 20 then just to be belt and suspenders looked at a
15:36:19 21 portfolio of those bonds.

15:36:30 22 Q. My question was specifically with
15:36:32 23 respect to the bonds that you did study. Did you
15:36:35 24 make any observations on the liquidity of the
15:36:38 25 market for those bonds?

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15:36:41 1 A. Well, they, by constructed I think
15:36:44 2 traded on 85 percent of the days or more. And I
15:36:49 3 don't remember the turnover numbers in my head.
15:36:51 4 They were low but, you know, there was trading.

15:36:56 5 The larger bonds tend to have more
15:36:59 6 trading than the smaller ones.

15:37:02 7 Q. Yes, in terms of volume, did you do
15:37:04 8 anything to ascertain the volume of trading in
15:37:06 9 those bonds?

15:37:09 10 A. I did. I don't remember the numbers
15:37:11 11 off the top of my head. It varies. Some had
15:37:14 12 more trading than others, which is why I focused
15:37:16 13 on the top eight and then did a portfolio
15:37:19 14 approach.

15:37:21 15 Q. At the beginning of the day when we
15:37:23 16 talked about event studies, you mentioned
15:37:25 17 transaction costs like the bid-ask spread.

15:37:27 18 Did you do anything to evaluate the
15:37:30 19 spread in the bonds that you studied?

15:37:37 20 A. I don't recall that one way or the
15:37:38 21 other.

15:37:41 22 Q. Within the context of bond trading,
15:38:00 23 are you familiar with the term, round lot?

15:38:09 24 A. Yes.

15:38:09 25 Q. What is a round lot in the context

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15:38:12 1 of bond trading?

15:38:13 2 A. Well, it would be -- I forget the
15:38:15 3 exact threshold. It is not the quantity
15:38:18 4 threshold like in shares, but a specific dollar
15:38:21 5 amount.

15:38:29 6 MR. BEDNAR: Sorry. We have I think
15:38:30 7 a mic on that shouldn't be.

15:38:30 8 BY MR. BEDNAR:

15:38:33 9 Q. Within the context of bond trading,
15:38:38 10 you just defined what a round lot is.

15:38:42 11 If bonds trade in smaller increments
15:38:45 12 is that called a small lot?

15:38:47 13 A. Typically, yes.

15:38:48 14 Q. And if bonds trade in increments
15:38:50 15 that are other than those round lots, is it
15:38:53 16 called an odd lot?

15:38:55 17 A. Yes.

15:38:55 18 Q. To get the same round number?

15:38:57 19 A. Yes.

15:38:58 20 Q. Do investors that trade in round
15:39:04 21 lots or small lots, is there typically a discount
15:39:08 22 that is involved on the price for trading in
15:39:10 23 those lots?

15:39:11 24 A. I don't know what you mean by a
15:39:16 25 discount. You may be asking about bid-ask

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15:39:19 1 spreads. I'm not sure.

15:39:20 2 Q. Do you know an approximate threshold
15:39:23 3 for, at which the round lot -- or excuse me.
15:39:28 4 That an odd lot or small lot discount would kick
15:39:32 5 in for a corporate bond like Rio Tinto's?

15:39:37 6 A. Off the top of my head, the word,
15:39:40 7 discount, as you are using it there may not be a
15:39:43 8 term of art. But, no, not off the top of my
15:39:45 9 head.

15:39:46 10 Q. Okay. Do you recall roughly was it
15:39:47 11 100,000, 500,000 dollars?

15:39:50 12 A. I don't recall, so same answer.

15:39:53 13 Q. Okay. And, are you familiar with
15:40:04 14 round lot increments defined in anything below
15:40:08 15 \$100,000 in a corporate bond market for an issuer
15:40:12 16 like Rio Tinto?

15:40:12 17 A. I don't recall, sorry.

15:40:14 18 Q. So, if a customer bought and sold
15:40:26 19 Rio Tinto bonds during the period that you
15:40:28 20 studied in anything other than a round lot, they
15:40:34 21 may have paid a discount for that trade. Right?

15:40:39 22 A. I'm not sure what you mean by
15:40:41 23 discount, but it is possible that a transactions
15:40:45 24 costs were higher, if that is what you mean?

15:40:47 25 Q. Right, right. So, they would have

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15:40:49 1 had potentially higher -- excuse me, higher
15:40:51 2 transaction prices for trading in round lots --
15:40:55 3 or, excuse me, in odd lots or small lots, right?

15:40:59 4 A. Possibly, but I can't imagine what
15:41:02 5 the question is. If the question is what is the
15:41:04 6 fundamental value of the security.

15:41:06 7 But, it's your line of questioning.

15:41:10 8 Q. Well, for purposes of determining
15:41:11 9 the daily returns on prices, if you have some
15:41:16 10 trades that are occurring with higher transaction
15:41:19 11 costs due to being odd-lot or small-lot trades,
15:41:23 12 is that going to have an effect on your
15:41:25 13 observations of what the daily returns are?

15:41:29 14 A. If I understand your question, I
15:41:34 15 don't think so. They may be to an individual
15:41:36 16 trader who is trying to.

15:41:38 17 Q. Well, if you have some trades that
15:41:50 18 occur with higher transaction costs due to the
15:41:53 19 size of the lot that they are sold in, and some
15:41:56 20 trades that do not, isn't that going to affect
15:42:03 21 the size of the daily returns that you measured?

15:42:07 22 MR. KIRSCH: Objection.

15:42:13 23 THE WITNESS: I'm not following the
15:42:14 24 question. I certainly see that some
15:42:16 25 investors would get less if that is the

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15:42:19 1 question.

15:42:23 2 BY MR. BEDNAR:

15:42:25 3 Q. And then in -- and that is an
15:42:25 4 issue -- transaction costs associated with the
15:42:27 5 size of the lot that is being traded, that is not
15:42:31 6 an issue that applies to your equity event study
15:42:34 7 of Rio Tinto, right?

15:42:38 8 A. No, it would not.

15:42:40 9 Q. Okay. Would you agree with me that
15:42:44 10 a fair amount of the corporate bond market
15:42:47 11 involves transactions with dealers?

15:42:49 12 A. Yes.

15:42:49 13 Q. What is a dealer in this context?

15:42:53 14 A. Well a dealer would be like a market
15:42:56 15 maker. So, part of the spreads would come out,
15:42:59 16 bid-ask spreads, in the form of discount. It is
15:43:06 17 about the confidence and of a dealer.

15:43:07 18 Q. And, so that bid ask spread would be
15:43:09 19 a transaction cost that is present in a
15:43:11 20 transaction with a dealer, right?

15:43:13 21 A. Correct.

15:43:14 22 Q. And that cost may not be present in
15:43:17 23 transactions that are between two customers with
15:43:20 24 no dealer present. Correct?

15:43:23 25 A. Yes. Imagine very large customers

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15:43:27 1 or something like that, yes.

15:43:29 2 Q. And so, would you agree that the
15:43:41 3 amount of trading that is occurring in the Rio
15:43:44 4 Tinto bonds is relatively small, that the impact
15:43:47 5 of transaction costs could move the daily returns
15:43:53 6 that you are measuring?

15:44:01 7 A. It is possible. Some of these bonds
15:44:03 8 may well be traded more than others, but that is
15:44:05 9 why I looked at a portfolio.

15:44:15 10 Q. When say you looked at a portfolio,
15:44:17 11 what do you mean?

15:44:18 12 A. I mean what I said in the report.
15:44:19 13 So, I looked at the evaluated portfolio of the
15:44:21 14 eight bonds that I identify.

15:44:22 15 Q. That is not the same thing as an
15:44:26 16 industry index is it?

15:44:27 17 A. No, I'm not trying to do an industry
15:44:30 18 index.

15:44:31 19 Q. You can do an industry index for a
15:44:34 20 bond event study, right?

15:44:36 21 A. I wasn't sure why I would here, but
15:44:42 22 I didn't.

15:44:46 23 MR. BEDNAR: I think if we can go
15:44:47 24 off the record and take a short break, five
15:44:49 25 to 10 minutes.

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15:44:51 1 THE WITNESS: Okay.

15:44:52 2 MR. KIRSCH: Sure. Of course.

15:44:53 3 Thank you.

15:44:53 4 THE VIDEOGRAPHER: We are going off
15:44:54 5 the record. The time is 3:44 eastern.

15:44:58 6 (Recess taken -- 3:44 p.m.)

16:03:34 7 (After recess -- 4:03 p.m.)

16:03:34 8 THE VIDEOGRAPHER: We are going back
16:03:46 9 on the record. The time is 4:03 eastern.

16:03:50 10 BY MR. BEDNAR:

16:03:52 11 Q. Dr. Hubbard, I wanted to continue
16:03:53 12 with a few questions about the bond market.

16:03:55 13 Are you familiar with the term,
16:03:57 14 bid-ask bounce?

16:03:59 15 A. I'm sorry. Did you say bid ask
16:04:02 16 bounce?

16:04:02 17 Q. That's correct.

16:04:03 18 A. I have a layman's understanding,
16:04:06 19 yes. I'm not a trader, but --

16:04:08 20 Q. What is your understanding of that
16:04:09 21 term?

16:04:11 22 A. Just a bounce off of a -- if you
16:04:15 23 have a high bid-ask spread, you can have bouncing
16:04:19 24 prices. I don't know if that is in the sense of
16:04:21 25 what you meant. If not, ask me a different --

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16:04:24 1 Q. And does that mean that you may have
16:04:26 2 some bond trades that are executing at the bid,
16:04:29 3 right?

16:04:30 4 A. Possible.

16:04:32 5 Q. And then other trades may execute at
16:04:34 6 the ask, right?

16:04:35 7 A. That is also possible.

16:04:37 8 Q. And in a bond market, those spreads
16:04:41 9 can be large relative to what you would see in
16:04:45 10 the equity market, right?

16:04:46 11 A. That is certainly true.

16:04:49 12 Q. And so, the phenomenon of the
16:04:55 13 bid-ask bounce means that you could have
16:04:59 14 significant variation in the prices at which
16:05:02 15 trades are occurring relative to the underlying
16:05:06 16 fundamental price of the bid -- of the bond.
16:05:08 17 Correct?

16:05:09 18 A. Maybe. But, I mean it depends on
16:05:15 19 the size of the bid-ask -- there is nothing
16:05:18 20 unique to the bounce. The size of the bid-ask
16:05:21 21 spread itself is generating that. And that is
16:05:24 22 higher for bonds than stocks, if that is your
16:05:26 23 question.

16:05:26 24 Q. Uh-huh. What were the spreads for
16:05:28 25 the Rio Tinto bond that you analyzed?

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16:05:30 1 A. I don't recall.

16:05:31 2 MR. KIRSCH: At what period of time?

16:05:33 3 MR. BEDNAR: During the period of
16:05:34 4 time that --

16:05:44 5 THE WITNESS: I don't recall, sorry.

16:05:46 6 BY MR. BEDNAR:

16:05:46 7 Q. And so I think that we previously
16:05:55 8 discussed it, but the presence of transaction
16:05:57 9 costs related to dealers in a bond market could
16:06:04 10 result in bond executing at prices different from
16:06:09 11 where they would execute if the transactions were
16:06:16 12 between two customers with no dealer. Right?

16:06:19 13 A. That is possible, yes.

16:06:20 14 Q. And, for trades that are executed
16:06:29 15 other than in round lot increments, they may be
16:06:34 16 executing at prices different from what they
16:06:37 17 would execute if there weren't that round lot
16:06:42 18 pricing in the bond market, right?

16:06:44 19 A. That is possible, too.

16:06:45 20 Q. And then, you've got prices in the
16:06:51 21 bond event study that may be subject to that
16:06:56 22 phenomenon found in between the bid and the ask,
16:06:58 23 right?

16:06:59 24 A. All of that is possible, yes.

16:07:01 25 Q. And, all of that means that you may

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16:07:06 1 have standard deviations for your daily returns
16:07:11 2 that are larger than what they would be in the
16:07:15 3 absence of those bond market features. Right?

16:07:20 4 A. You are asking about a set of
16:07:22 5 theoretical possibilities, right? I disagree
16:07:25 6 that those are theoretical possibilities.

16:07:28 7 Q. And so, that means that it is
16:07:33 8 possible that in an event study, that the bond
16:07:36 9 market, if there are larger standard deviations,
16:07:40 10 does that mean that the abnormal return on the
16:07:43 11 day that you are evaluating in the event study
16:07:47 12 would have to be correspondingly larger to
16:07:50 13 achieve statistical significance, right?

16:07:53 14 A. As a theoretical matter that would
16:07:55 15 be true. These are all theoretical questions.

16:07:57 16 Q. And, did you do anything to address
16:08:02 17 how those theoretical questions would imply --
16:08:05 18 would apply empirically to trading in the Rio
16:08:08 19 Tinto bonds that you have studied?

16:08:11 20 A. I don't see how you could, beyond
16:08:13 21 what I did which is look at the arguably more
16:08:16 22 liquid securities and then look at a portfolio of
16:08:18 23 them with fewer documents. I you would like to
16:08:22 24 ask about a different portfolio or work that you
16:08:25 25 have done, I'm happy to talk about it.

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16:08:27 1 These questions are all theoretical.

16:08:29 2 Q. And when you say that you looked at
16:08:31 3 the relatively more liquid securities, you are
16:08:33 4 referring to the bonds that you looked at that
16:08:35 5 traded on 85 percent or more of the 120-day
16:08:39 6 period that you looked at. Is that right?

16:08:40 7 A. Yes, sir.

16:08:43 8 Q. If there is a day -- let me ask you
16:08:49 9 a very basic question.

16:08:50 10 So, does that mean that for those
16:08:54 11 bonds, they may have not traded on 15 percent or
16:08:58 12 more of the days. Right?

16:09:00 13 A. I think we know that is true. It is
16:09:02 14 a possibility.

16:09:03 15 Q. So, if there is a day where you
16:09:05 16 don't have a price, that means that you are
16:09:09 17 missing two observations for daily returns,
16:09:14 18 right?

16:09:14 19 A. That is theoretically possible.

16:09:20 20 Q. If you don't have a bond price for a
16:09:23 21 Thursday, that means that you can't calculate a
16:09:25 22 daily return from Wednesday to Thursday, right?

16:09:28 23 A. Sure, I don't know how often this
16:09:32 24 actually happens, but these are theoretical
16:09:34 25 possibilities.

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16:09:35 1 Q. And then if you don't have a trade
16:09:37 2 on a Thursday, then you can't calculate a daily
16:09:41 3 return Thursday to Friday, right?

16:09:42 4 A. If that were the case, that would be
16:09:44 5 a problem, yes.

16:09:45 6 Q. And so, would that mean that for the
16:09:52 7 bonds that you studied, the percentage of total
16:09:56 8 observation that was captured would be less than
16:09:59 9 85 percent. Correct?

16:10:00 10 A. Yes. I don't recall what the
16:10:05 11 falloff is. It would be in the backup.

16:10:07 12 Q. Okay. But, that basic logic that
16:10:11 13 missing one day could lead to missing more than
16:10:14 14 one observation, that is a basic logic that you
16:10:17 15 accept, right?

16:10:17 16 A. It is possible. I don't know how
16:10:19 17 quantitatively important it is. But, it is
16:10:21 18 certainly possible.

16:10:22 19 BY MR. BEDNAR:

16:10:22 20 Q. Okay. So, I'm going to -- excuse
16:10:32 21 me, pull up Exhibit 1247.

16:10:42 22 This is a screenshot. And I'm using
16:10:49 23 this to show you the source of information for a
16:10:51 24 particular bond that I want to ask you some
16:10:54 25 questions about.

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16:10:54 1 Do you see here that there is, that
16:11:01 2 this screenshot shows information -- FINRA trace
16:11:05 3 information for a particular Rio Tinto bond; is
16:11:09 4 that correct?

16:11:09 5 A. Yes, sir.

16:11:09 6 (Exhibit Number 1247
16:11:09 7 marked for identification.)

16:11:12 8 BY MR. BEDNAR:

16:11:12 9 Q. And then if we -- and I'm sorry,
16:11:15 10 exhibit, that was Exhibit 1248.

16:11:18 11 Exhibit 1247 here shows you the
16:11:19 12 specific security with the issuer Rio Tinto
16:11:24 13 Finance USA and the CUSIP number for the specific
16:11:28 14 bond at issue, correct?

16:11:29 15 A. Yes, sir.

16:11:29 16 (Exhibit Number 1248
16:11:29 17 marked for identification.)

16:11:29 18 BY MR. BEDNAR:

16:11:30 19 Q. And then Exhibit 1248 identifies the
16:11:33 20 source of the pricing information which is the
16:11:35 21 FINRA trace records, correct?

16:11:47 22 A. Correct.

16:11:47 23 (Exhibit Number 1250
16:11:47 24 marked for identification.)

16:11:48 25 BY MR. BEDNAR:

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16:11:48 1 Q. So, if you look at Exhibit 1250, and
16:11:52 2 if you look at the line for January 17th, do you
16:12:02 3 see that there are four trades for that
16:12:04 4 particular bond on January 17th, correct?

16:12:06 5 A. I see that.

16:12:07 6 Q. And that means that your analysis of
16:12:16 7 that particular bond on that particular day
16:12:18 8 turned on four trades, right?

16:12:20 9 A. Yes, I asked the staff about this
16:12:22 10 and of course we kept an outlier on the low end.
16:12:26 11 And this problem could also be addressed by the
16:12:28 12 portfolio.

16:12:28 13 So, the record is clear this is not
16:12:30 14 a random choice on your part.

16:12:32 15 Q. Sure. What is the largest number of
16:12:34 16 trades in any one of the Rio Tinto bonds that you
16:12:36 17 analyzed on January 17th?

16:12:38 18 A. I really don't recall.

16:12:40 19 Q. Staying with this particular bond --
16:12:47 20 and I'm sorry, when you say asking the staff, did
16:12:50 21 you ask your staff about this particular bond
16:12:52 22 after you were provided the exhibits.

16:12:53 23 Is that what you are referring to?

16:12:54 24 A. Yes, sir, because I got the exhibits
16:12:57 25 and wondered what mischief might be made of it.

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16:12:57 1 (Exhibit Number 1249
16:12:57 2 marked for identification.)

16:13:02 3 BY MR. BEDNAR:

16:13:02 4 Q. And then, directing you to
16:13:06 5 Exhibit 1249, again on January 17th. That shows
16:13:14 6 you the total volume of that transaction -- of
16:13:17 7 those transactions, excuse me, in that Rio Tinto
16:13:19 8 bond, \$52,000, right?

16:13:24 9 A. I see that.

16:13:25 10 Q. That is obviously less than
16:13:28 11 \$100,000, right?

16:13:29 12 A. Yes. It would be a typical for that
16:13:35 13 security it looks like. But, yes, less than
16:13:37 14 \$100,000.

16:13:38 15 Q. And so, if the transaction costs for
16:13:41 16 dealing in odd lots or small lots, those would
16:13:45 17 apply to these trades, right?

16:13:47 18 A. They would, yes.

16:13:51 19 Q. I can take this down.

16:14:24 20 The analytical work that was done in
16:14:26 21 preparing your bond market event study, did you
16:14:29 22 perform that or did someone else?

16:14:32 23 A. The Analysis Group staff under my
16:14:40 24 direction did.

16:14:42 25 Q. And you picked the bonds that trade

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16:14:51 1 the most often. Is that right?

16:14:54 2 MR. KIRSCH: Objection.

16:14:55 3 THE WITNESS: I'm not sure what you
16:14:59 4 mean by that. Those are the ones they
16:15:00 5 analyzed for the event study, if that is your
16:15:02 6 question.

16:15:02 7 BY MR. BEDNAR:

16:15:04 8 Q. Sure. The ones that you analyzed
16:15:07 9 for the event study, were those chosen on the
16:15:10 10 basis of the bonds that traded most often?

16:15:12 11 A. Well, they crossed that threshold of
16:15:15 12 85 percent, yes.

16:15:16 13 Q. Okay. Were there any other criteria
16:15:18 14 for selecting which bonds to analyze?

16:15:20 15 A. No, sir.

16:15:35 16 Q. Would you agree that bonds are more
16:15:37 17 likely to trade when there is news than when
16:15:40 18 there is not?

16:15:42 19 Let me phrase that a little
16:15:44 20 differently. Do you agree that bonds are more
16:15:46 21 likely to trade when there is bond specific news
16:15:50 22 than when there is not?

16:15:50 23 A. Generally, securities would react to
16:15:54 24 news by having higher volume, if that is your
16:15:56 25 question. But, news is a term of art.

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16:16:01 1 The colloquial use of the word.

16:16:04 2 Q. And what do you mean by news?

16:16:06 3 A. News, unexpected by the market. As
16:16:12 4 far as it is an item in the news.

16:16:18 5 Q. Okay. And, so you agree that using
16:16:20 6 that definition as news from specific news that
16:16:24 7 is unexpected by the market, you would expect
16:16:26 8 bonds to be more likely to trade on those days
16:16:29 9 than on days when there is no unexpected firm
16:16:32 10 specific news, right?

16:16:33 11 A. Yes, sir, if there were relevant
16:16:35 12 news.

16:16:39 13 Q. And then if there is no relevant
16:16:42 14 news on a given day, that is when bonds would be
16:16:45 15 less likely to trade, right?

16:16:46 16 A. Well, as often with your questions
16:16:48 17 you are forgetting to say all other things equal,
16:16:51 18 but I will assume you meant that.

16:16:53 19 Q. For the days in your event study
16:16:59 20 where there is no observed trade, if there had
16:17:02 21 been an observed trade, would it be likely to
16:17:04 22 have occurred -- excuse me, to yield a smaller
16:17:07 23 abnormal return than on the days where there is
16:17:12 24 news?

16:17:13 25 MR. KIRSCH: Objection.

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16:17:14 1 THE WITNESS: I'm not even sure what
16:17:15 2 you are asking. Why don't you follow up?

16:17:19 3 BY MR. BEDNAR:

16:17:19 4 Q. Well, for instance in the equity
16:17:22 5 market, for a firm like Rio Tinto, the trades in
16:17:28 6 a particularly liquid market, there may be trades
16:17:31 7 going on, on days where you can't identify any
16:17:33 8 unexpected firm specific-news, right?

16:17:35 9 A. Sure.

16:17:36 10 Q. So, for the bond market, for the
16:17:38 11 days where there was no observed transaction, if
16:17:43 12 we hypothesize transactions occurring on those
16:17:47 13 days, would you expect them to yield lower
16:17:52 14 returns -- lower abnormal returns than on days
16:17:56 15 where there is firm-specific news?

16:18:02 16 A. I guess I still don't understand the
16:18:03 17 question. So I don't know, one way or the other.

16:18:06 18 Q. In a market where there are
16:18:24 19 relatively few trades occurring for the security,
16:18:30 20 if trades are more likely to occur on days when
16:18:33 21 there is news, will that have an impact on the
16:18:38 22 standard deviation of daily returns?

16:18:40 23 MR. KIRSCH: Objection, vague.

16:18:42 24 THE WITNESS: I would need more to
16:18:45 25 understand that. Might, might not.

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16:18:55 1 BY MR. BEDNAR:

16:18:56 2 Q. Do you think that the fundamental
16:18:58 3 value of the bond changes less when there is no
16:19:01 4 news?

16:19:05 5 MR. KIRSCH: Objection, vague.

16:19:06 6 THE WITNESS: I don't think that is
16:19:08 7 a very well posed question, because market
16:19:11 8 participants may be reevaluating bonds all of
16:19:16 9 the time.

16:19:16 10 I'm not quite sure what you are
16:19:18 11 asking.

16:19:18 12 BY MR. BEDNAR:

16:19:55 13 Q. And you don't have an opinion as to
16:19:56 14 whether the fundamental value of the company's
16:20:00 15 bonds changes on -- it is more or less likely to
16:20:05 16 change on days when there is no news?

16:20:07 17 MR. KIRSCH: Objection.

16:20:08 18 THE WITNESS: As you have asked that
16:20:10 19 question, I wouldn't know how to answer it.
16:20:13 20 So, no, I wouldn't have an opinion.

16:20:17 21 BY MR. BEDNAR:

16:20:17 22 Q. Are you saying that you don't
16:20:18 23 understand the term, fundamental value?

16:20:21 24 A. I understand the term, fundamental
16:20:23 25 value. I don't understand your question. I

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16:20:28 1 don't think it is well posed. So, I gave the
16:20:30 2 answer I gave.

16:20:31 3 I'm not here to help you ask it.

16:20:32 4 Q. What do you understand the term,
16:20:35 5 fundamental value, to mean?

16:20:36 6 A. Fundamental value of securities is
16:20:39 7 its present value of cash flow.

16:20:45 8 Q. And is fundamental value influenced
16:20:48 9 by the announcement of unexpected firm-specific
16:20:53 10 news?

16:20:53 11 A. We are talking about a bond or a
16:20:55 12 stock?

16:20:56 13 Q. Well, let's start with bonds.

16:20:59 14 A. It may or may not be. It could be
16:21:02 15 news on the firm that doesn't affect the ability
16:21:05 16 to pay a bond.

16:21:06 17 Remember the bondholders don't get
16:21:08 18 upside. They get their money back. It could be
16:21:11 19 a variety of pieces of news that really don't
16:21:14 20 have much of an impact on bonds, even though they
16:21:17 21 may have an impact on equity.

16:21:19 22 Q. So, on a day when there is no
16:21:21 23 unexpected firm-specific news, would you expect
16:21:24 24 there to be a change in the fundamental value of
16:21:26 25 a company's bonds?

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16:21:28 1 A. There could well be, because there
16:21:30 2 could be changes in market discount rates. The
16:21:34 3 overall movements in the term structure of
16:21:36 4 interest rates.

16:21:50 5 Q. And, so I think that your answer is
16:21:53 6 on a day when there is no unexpected
16:21:57 7 firm-specific news, the fundamental value of a
16:22:00 8 company's bonds may change if there is news
16:22:05 9 affecting the market as a whole. Is that
16:22:09 10 correct?

16:22:10 11 A. That is not what I said.

16:22:11 12 MR. KIRSCH: Objection --

16:22:12 13 THE WITNESS: I said --

16:22:13 14 MR. KIRSCH: Object to form. Sorry.
16:22:16 15 I was just saying objection, mischaracterizes.

16:22:19 16 THE WITNESS: I said market discount
16:22:22 17 rates for this premium. You can imagine
16:22:25 18 monetary policy actions or no overall view of
16:22:29 19 risk in the corporate sector having nothing
16:22:32 20 to do with a particular firm. Covid-19,
16:22:36 21 there are lots of things like that.

16:22:42 22 BY MR. BEDNAR:

16:22:43 23 Q. So in the absence of news, whether
16:22:44 24 it is defined as firm-specific news or the type
16:22:47 25 of nonspecific news that you have just listed,

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16:22:50 1 would you expect, in the absence of any such news
16:22:52 2 like that, for the fundamental value of a
16:22:54 3 company's bonds to change?

16:22:56 4 A. I wouldn't think the fundamental
16:23:03 5 value would change, no.

16:23:08 6 Q. I think I'm going to shift gears,
16:23:31 7 Dr. Hubbard.

16:23:32 8 As a result of your study, sorry --

16:23:59 9 As a result of your work in this
16:24:01 10 case, were you able to reach a statistical
16:24:08 11 conclusion as to the effect on Rio Tinto's ADR
16:24:12 12 prices of any specific piece of information that
16:24:17 13 was disclosed on January 17th, 2013?

16:24:22 14 A. Well, if I am understanding your
16:24:25 15 question, the effects, whether they are measured
16:24:30 16 by Dr. Metz or by me, are statistically and
16:24:35 17 significantly different from 0.

16:24:37 18 And so what I do is look at the
16:24:39 19 underlying components of information.

16:24:42 20 So, I'm -- the statistical
16:24:45 21 conclusion is clear. It is insignificant, but we
16:24:48 22 get to go further and that is what I tried to do.

16:24:51 23 Q. Okay. Your report included a
16:25:06 24 section related to Rio Tinto's credit rating.

16:25:09 25 And it is your opinion that if Rio

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16:25:21 1 Tinto had announced an impairment to RTM as part
16:25:25 2 of the past year 2012 financial result, that
16:25:29 3 there would not have been a change to Rio Tinto's
16:25:31 4 credit rating. Is that correct?

16:25:33 5 A. That is correct. I had two opinions
16:25:37 6 in there. One was about meeting the R price
16:25:41 7 equity, and the other about credit rating.

16:25:46 8 Q. And with respect to the credit
16:25:47 9 rating, is one basis for that opinion that there
16:25:53 10 was no rating action after Rio Tinto announced
16:25:56 11 the impairment in 2013?

16:25:58 12 A. Yes, that is correct.

16:26:00 13 Q. Is another basis for that opinion
16:26:04 14 your interpretation of the role that impairments
16:26:07 15 play in the quantitative methodologies of the
16:26:10 16 main rating agencies?

16:26:12 17 A. I thought of it more as an input.
16:26:15 18 The real issue is did they or didn't they change
16:26:17 19 the rating. And they did not.

16:26:20 20 Q. So, in evaluating the hypothetical
16:26:33 21 question of what would have happened to Rio
16:26:35 22 Tinto's credit rating if an impairment had been
16:26:39 23 announced at half year 2012, would you need to,
16:26:47 24 as part of that analysis, look at the financial
16:26:52 25 condition of Rio Tinto as of that time?

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16:26:57 1 A. I'm not sure what you are asking.
16:27:00 2 Obviously financial position is critical for
16:27:03 3 credit ratings. That is no different from equity.

16:27:07 4 In fact, some impairments might
16:27:10 5 actually improve cash flows for debt holders for
16:27:14 6 a period of time, while hurting equity.

16:27:16 7 Q. So, for credit rating purposes, you
16:27:20 8 would want to look at Rio Tinto's financial
16:27:23 9 position as of the time that you are evaluating a
16:27:25 10 hypothetical impairment analysis. Correct?

16:27:30 11 A. Yes, that is what a rating agency
16:27:32 12 would do.

16:27:32 13 Q. Sure. So, for instance, in January
16:27:38 14 of 2013, prior to the announcement of the
16:27:43 15 impairment, Rio Tinto had also been able to
16:27:46 16 announce in the second half of 2012, the
16:27:49 17 completion of a \$5 billion cost reduction
16:27:55 18 program. Right?

16:27:56 19 A. It is not my understanding. I think
16:27:59 20 they announced a \$5 billion cost reduction
16:28:02 21 program that they are working on, which I agree
16:28:04 22 is very positive.

16:28:12 23 Q. And so it is your view that
16:28:14 24 announcing a program for saving \$5 billion in
16:28:17 25 costs is positive, right?

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16:28:20 1 A. It is certainly going to bolster
16:28:22 2 cash flows for the company.

16:28:24 3 Q. And announcing the breakdown of the
16:28:27 4 \$3 billion asset would not be viewed as negative
16:28:30 5 to the company?

16:28:32 6 A. Are we talking about bonds or
16:28:34 7 stocks?

16:28:36 8 Q. Either.

16:28:40 9 A. Well, let's start with bonds. Like
16:28:43 10 in the case of stocks that I talk about, the
16:28:45 11 market had already borne an expectation.

16:28:49 12 And given that the debt securities
16:28:51 13 were highly rated, there was little worry about
16:28:54 14 the company's ability to repay the debt.

16:28:57 15 And, given that, I found no effect
16:29:00 16 on equities, the rating agencies don't change, I
16:29:04 17 wouldn't expect to find much of that, if at all.

16:29:08 18 Q. So, if you were to analyze the
16:29:11 19 potential effect, for hypothetical half year 2012
16:29:16 20 impairment announcement from Rio Tinto's credit
16:29:19 21 rating, first of all, you need to evaluate Rio
16:29:25 22 Tinto's financial condition before they raised
16:29:28 23 money in their August 2012 bond offerings.
16:29:31 24 Correct?

16:29:33 25 A. But again it depends on what

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16:29:35 1 information the market has. But, you would want
16:29:38 2 the information available in the marketplace at
16:29:40 3 that time, if that is your question.

16:29:41 4 Q. Yes, okay. Now, I want to make sure
16:29:47 5 I understand one aspect of your opinion.

16:29:49 6 It is not your opinion that the
16:29:51 7 rating agencies would never consider impairments
16:29:55 8 in making a ratings decision, right?

16:29:57 9 A. Correct. I think I say that in the
16:29:59 10 report.

16:30:00 11 Q. Okay. And, even if impairments are
16:30:04 12 excluded from the quantitative measures that a
16:30:08 13 rating agency employs, the rating committee still
16:30:11 14 may consider the impact of the impairment and
16:30:13 15 ascertaining whether to take any rating action.
16:30:17 16 Right?

16:30:18 17 A. It is possible. But, they didn't
16:30:20 18 take any rating action.

16:30:21 19 Q. In 2013, right?

16:30:25 20 A. Correct.

16:30:26 21 Q. Did you know that in April of 2011,
16:30:35 22 Moody upgraded Rio Tinto by one notch in its
16:30:37 23 rating?

16:30:37 24 A. I think I probably mention that in
16:30:39 25 the report, but I don't recall the exact date.

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16:30:43 1 Q. And, that rating action was
16:30:49 2 announced after the Riversdale acquisition.
16:30:52 3 Right?

16:30:54 4 A. Yes.

16:30:55 5 MR. KIRSCH: Objection.

16:30:58 6 THE WITNESS: That is my
16:30:59 7 recollection, I should say. I don't know
16:31:00 8 exactly when it was, but that is my
16:31:02 9 recollection.

16:31:03 10 BY MR. BEDNAR:

16:31:03 11 Q. And, do you have any basis to say
16:31:12 12 whether the Riversdale impairment was a factor
16:31:16 13 considered -- I'm sorry. I said impairment. Let
16:31:19 14 me rephrase the question.

16:31:21 15 Do you have any basis to say whether
16:31:23 16 or not the Riversdale acquisition was a
16:31:26 17 consideration taken into account by Moody in
16:31:31 18 upgrading the credit ratings in April of 2011?

16:31:37 19 A. I don't recall what I saw there. I
16:31:40 20 would doubt it, since such an acquisition is
16:31:43 21 large negative cash flows for a long period of
16:31:45 22 time with the hope of positive cash flows in the
16:31:48 23 future.

16:31:48 24 But, I don't think I have ever heard
16:31:56 25 of it for equity, but I don't recall.

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16:32:02 1 Q. I wanted to ask you a question with
16:32:17 2 respect to your analysis of so-called Altes
16:32:28 3 statements. And, first, I want to ask you to
16:32:31 4 pull up your report so I can have you look at
16:32:34 5 some language.

16:32:34 6 A. Okay.

16:32:51 7 Q. And it is Exhibit 224. I will take
16:32:57 8 you to the page first, and then I will put it up
16:32:59 9 on the screen for you.

16:33:17 10 Paragraph 158 of Page 94 of the PDF,
16:33:22 11 and I think Page 90 of the report itself.

16:33:25 12 A. Okay. I am there.

16:33:29 13 Q. Thanks. You wrote, "To summarize, I
16:33:32 14 find that there is no conclusive evidence of a
16:33:35 15 statistically significant ADR price increase on
16:33:39 16 August 8, 2012."

16:33:41 17 And this is kind of a technical
16:33:43 18 question.

16:33:43 19 So, you ran a regression for the
16:33:48 20 abnormal return on August 8, 2012. And you ran
16:33:52 21 one for using the HSBC Mining Index and one using
16:33:57 22 your eight company comparator index. Right?

16:34:00 23 A. Correct.

16:34:01 24 Q. And, there was a statistically
16:34:06 25 significant return using one of those indices,

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16:34:10 1 right?

16:34:11 2 A. That is correct.

16:34:11 3 Q. And do you recall as you sit here
16:34:15 4 which one?

16:34:18 5 A. I don't. You could check, if it is
16:34:20 6 important to you. It might be -- should I check?
16:34:25 7 Is that important, or --

16:34:31 8 Q. I can direct you to -- just so we
16:34:33 9 can state it clearly on the record. I don't know
16:34:36 10 that I would say that it is important.

16:34:37 11 But, if we go back a few pages to
16:34:40 12 Paragraph 159, which I have up on the screen.
16:34:46 13 And in the middle of the paragraph, you say,
16:34:50 14 "I show in Exhibit 12," and then you identify
16:34:55 15 that "using the equal weighted peer index, there
16:35:01 16 was not a positive abnormal return on August 8th
16:35:04 17 that was statistically significant."

16:35:05 18 A. Okay.

16:35:06 19 Q. There is a statistically significant
16:35:10 20 positive abnormal return using the HSBC Global
16:35:17 21 Mining Index. Do you see that?

16:35:18 22 A. Yes.

16:35:18 23 Q. And it is statistically significant
16:35:21 24 at the 5 percent level, right?

16:35:23 25 A. Yes, that is what I find.

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16:35:25 1 Q. And, so my question is really, in
16:35:31 2 Paragraphs 168, where you said, "I find there is
16:35:34 3 no conclusive evidence of a statistically
16:35:36 4 significant ADR price increase on August 8,
16:35:41 5 2012," is would it require both of your industry
16:35:49 6 indices producing statistically significant
16:35:52 7 abnormal returns for you to conclude that there
16:35:55 8 was conclusive evidence?

16:35:59 9 A. Yes. Yes. And since I tendered
16:36:02 10 them both, that is not really the point of this
16:36:05 11 paragraph.

16:36:05 12 The point of the paragraph is
16:36:06 13 whether I found statistically significant returns
16:36:10 14 in both, it wouldn't have mattered, because I
16:36:13 15 attributed those returns elsewhere. That was my
16:36:15 16 analysis of the analysts' commentary. No one
16:36:19 17 mentioned so I didn't state it.

16:36:21 18 Q. Sure. I'm really trying to
16:36:24 19 ascertain is it your standard that both of your
16:36:26 20 industry indices need to produce statistically
16:36:29 21 significant abnormal returns at the 5 percent
16:36:31 22 level, for there to be conclusive evidence that
16:36:34 23 there is a statistically significant result?

16:36:37 24 A. Well, I think to be conclusive, yes.
16:36:40 25 I mean part of the problem here, as

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16:36:42 1 we talked about all day, is some of the fragility
16:36:45 2 here, which is why it is useful looking at the
16:36:48 3 analysts' commentary. And the analysts don't
16:36:51 4 mention the results.

16:37:01 5 Q. And let me just focus on -- not on
16:37:04 6 analysis of analysts' commentary.

16:37:05 7 But, when you talk about conclusive
16:37:11 8 evidence of a statistically significant price
16:37:13 9 increase, does that require both of your industry
16:37:15 10 indices to agree on the result before you would
16:37:17 11 say that there is conclusive evidence of
16:37:20 12 statistical significance?

16:37:22 13 A. You asked the question before so I
16:37:24 14 will give the same answer. These are both
16:37:29 15 reasonable indices.

16:37:30 16 It would concern me if I get
16:37:32 17 different answers depending on which reasonable
16:37:36 18 index that I use.

16:37:37 19 So, it is not conclusive. I don't
16:37:40 20 even think it is important for the reason in the
16:37:41 21 paragraph. It is certainly not conclusive.

16:37:45 22 Q. Does the fact that the -- in your
16:37:47 23 conclusion -- well, let me say this:

16:37:52 24 Does the fact that the equal waited
16:37:54 25 peer index did not experience a statistically

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16:37:56 1 significant return while the HSBC Mining Index
16:38:03 2 did, does that say anything to you about the
16:38:06 3 relative predictive power of either index?

16:38:12 4 A. I don't see how it could. It might
16:38:16 5 to you, because you might be assuming that
16:38:18 6 conclusion.

16:38:18 7 But, I don't see how it would one
16:38:21 8 way or the other. The statement is simply that
16:38:24 9 it is not conclusive. I think that is obvious.
16:38:26 10 And in the rest of the paragraph it says that it
16:38:29 11 is not important.

16:38:41 12 Q. So, is what you are saying that you
16:38:43 13 would have reached the same conclusion if the
16:38:45 14 results were inverted and the equal weighted peer
16:38:48 15 index found a statistically significant return
16:38:51 16 while the HSBC Mining Index did not?

16:38:53 17 A. Yes. And the fact that they were
16:38:55 18 both statistically significant, I would still
16:38:59 19 reach an unimportant conclusion.

16:39:16 20 Q. I wanted to return, if I could, to
16:39:19 21 the definition that you provided earlier, to the
16:39:22 22 definition of economic materiality.

16:39:24 23 Is it my understanding that your
16:39:25 24 definition of economic materiality turns on what
16:39:29 25 the reasonable investor would view as important?

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16:39:33 1 A. If you are talking about in the
16:39:35 2 context of a securities case, yes. Whether a
16:39:38 3 reasonable investor would feel important in the
16:39:42 4 context of that would be in framing a view of
16:39:46 5 what is paid for securities. It is really about
16:39:48 6 the price.

16:39:51 7 Q. And so then, are you saying that
16:39:55 8 securities prices, let's say equity prices, are
16:40:00 9 determined by the views of reasonable investors?

16:40:03 10 A. Well, the marginal investor in the
16:40:10 11 market that sets the price. The term, reasonable
16:40:14 12 investor, is the investor who is using available
16:40:17 13 information.

16:40:22 14 Q. So, reasonable investors may
16:40:23 15 disagree with each other. Right?

16:40:25 16 A. In fact, they do all of the time.
16:40:27 17 It is called trading.

16:40:30 18 Q. And the price is set by the marginal
16:40:33 19 investor. Is that what you said?

16:40:34 20 A. Correct.

16:40:35 21 Q. What does that mean the marginal
16:40:37 22 investor?

16:40:38 23 A. It means what it says, is at the
16:40:40 24 margin, there are trades that set the price and
16:40:45 25 great benefit of markets is that.

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16:40:47 1 So, even if somebody's grandmother
16:40:50 2 is not an informed investor, a marginal investor,
16:40:54 3 being informed, you still get the right price.

16:40:56 4 And so foundation of securities
16:40:58 5 markets in our time.

16:41:03 6 Q. So, there are reasonable investors
16:41:05 7 whose views are not captured with the stock
16:41:08 8 price?

16:41:11 9 A. If you mean does the stock price
16:41:13 10 represent every investor's view of fundamental
16:41:17 11 value? Of course not. That is what trading is
16:41:19 12 about.

16:41:19 13 Q. Okay. Doctor, I wanted to kind of
16:41:25 14 do an inventory to make sure that I have properly
16:41:30 15 understood the scope of additional work that you
16:41:33 16 have performed that is not captured in your
16:41:37 17 report.

16:41:37 18 And I can take the report down
16:41:39 19 because I don't think that we need to refer to
16:41:41 20 it.

16:41:41 21 I know that you referred to
16:41:46 22 sensitivity analysis that you did related to the
16:41:50 23 HSBC Mining Index.

16:41:52 24 A. Yes, sir.

16:41:53 25 Q. And was that done after you received

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16:41:58 1 the Metz rebuttal report or after Dr. Metz
16:42:02 2 testified?

16:42:03 3 A. After his deposition.

16:42:04 4 Q. Okay. I know that you also
16:42:06 5 testified to running a sensitivity of what would
16:42:08 6 happen if you removed Newmont Mining from the
16:42:15 7 eight company comparator index. Right?

16:42:17 8 A. Yes.

16:42:19 9 Q. And I think that we already covered
16:42:21 10 this. I just want to make sure. That was the
16:42:23 11 only sensitivity that you ran on that date,
16:42:27 12 number, index, right?

16:42:28 13 A. Yes, because that is the criticism I
16:42:30 14 thought Dr. Metz had made. Why don't we just
16:42:32 15 check, but yes, sure.

16:42:33 16 Q. Yes. Just trying to make sure that
16:42:35 17 I have the list correct of additional
16:42:37 18 sensitivities.

16:42:38 19 You didn't do any sensitivity
16:42:40 20 analyses that built on the 16 company list that
16:42:43 21 Dr. Metz talked about, right?

16:42:45 22 A. I may have. I think I may have done
16:42:48 23 some changes there that didn't affect my results,
16:42:52 24 but I don't recall.

16:42:54 25 Q. If you did additional analyses that

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16:43:02 1 didn't affect your results, would your team have
16:43:05 2 the regressions that you ran?

16:43:06 3 A. Of course.

16:43:09 4 Q. And did you at any time since you
16:43:15 5 submitted your report, have you run regressions
16:43:19 6 using any variation of the S&P Metals and Mining
16:43:23 7 Index?

16:43:25 8 A. Oh, let's see. I think I -- I think
16:43:30 9 the answer surely is yes. And I don't remember
16:43:34 10 everything that I did.

16:43:35 11 Because again I don't think that
16:43:37 12 index is fixable. But, I think I did do some
16:43:40 13 things and it didn't fix it in my view. But, I
16:43:43 14 don't recall. If we have it, we have it.

16:43:46 15 Q. Okay. You don't remember at all
16:43:49 16 what kind of analysis that would have been on the
16:43:51 17 S&P index?

16:43:54 18 A. I don't recall. I'm sorry.

16:43:56 19 Q. At any time in your work on this
16:44:00 20 case have you done any regressions where you
16:44:03 21 added one or more commodities prices to your
16:44:06 22 regression?

16:44:09 23 A. To the event study regression, you
16:44:12 24 mean?

16:44:13 25 Q. Correct.

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16:44:14 1 A. I don't recall doing that, no.

16:44:15 2 Q. Have you done any other regressions
16:44:27 3 after the submission of your report beyond what
16:44:29 4 we have just catalogued here?

16:44:33 5 A. No, unless there was something this
16:44:35 6 morning that -- I outlined it all this morning
16:44:38 7 with the first question.

16:44:39 8 Q. Okay. We have talked a number of
16:44:48 9 times about the work that you and your staff had
16:44:50 10 done in preparing the report.

16:44:52 11 Can you tell me the role, if any,
16:44:54 12 that your staff played in writing the report?

16:45:00 13 A. I wrote the report. But, obviously
16:45:03 14 received enormous amounts of -- as you can tell
16:45:07 15 much of this report is the appendices, the data,
16:45:11 16 the exercises.

16:45:12 17 But, the actual words on the report
16:45:14 18 are me. But, many more hours are spent by staff
16:45:18 19 in theory.

16:45:18 20 Q. Sure. Did your staff draft any
16:45:20 21 portions of the report?

16:45:23 22 A. We certainly passed things back and
16:45:27 23 forth if they would comment.

16:45:28 24 But, I am the principal
16:45:31 25 draftsman. Although I didn't personally do

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16:45:33 1 all of the tables, though.

16:45:34 2 Q. Uh-huh. Your report has several
16:45:48 3 indices that have summaries of news coverage or
16:45:51 4 analyst coverage. And an example would be
16:45:56 5 Appendix C2, which summarizes news coverage of
16:46:00 6 the Riversdale bid in the actual acquisition.

16:46:03 7 Who compiled Appendix C2? Or if it
16:46:11 8 is easier for you to talk about how the
16:46:13 9 appendices in general were complied, you could
16:46:16 10 answer that way.

16:46:17 11 A. Yes, that may be a good place to
16:46:19 12 start and then we can go into the individual ones
16:46:21 13 if you want.

16:46:21 14 So, in each case there was a
16:46:23 15 question I was trying to ask, and I sat with the
16:46:26 16 team to figure out what is a systematic way to
16:46:29 17 answer.

16:46:29 18 And in each case we needed, how do
16:46:32 19 you make sure you get all available analysts.
16:46:35 20 How do you make sure that you are doing a new
16:46:38 21 search that is not subject to any cherry picking.
16:46:42 22 So, there is key words, things you are doing.

16:46:44 23 In each of those cases we came to
16:46:46 24 that agreement of the team and of course the
16:46:48 25 year, in searching.

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16:46:49 1 Q. Okay. If it is helpful to you, I
16:46:59 2 can pull these exhibits up.

16:47:00 3 But, with respect to Appendix C.8 in
16:47:03 4 Exhibit 10.

16:47:06 5 A. C.8?

16:47:06 6 (Exhibit Number 1108
16:47:06 7 marked for identification.)

16:47:06 8 BY MR. BEDNAR:

16:47:08 9 Q. Yes. Appendix C.8 is
16:47:11 10 Exhibit 1101 [sic]. And I can go ahead and pull
16:47:13 11 it up so everyone can see it.

16:47:15 12 A. Yes, go ahead.

16:47:17 13 Q. Do you see in that appendix that
16:47:22 14 there are, and I am publishing it so all of the
16:47:29 15 attorneys can see as well, there are sort of a
16:47:32 16 scoring or a grading system for ascertaining
16:47:38 17 whether the analysts' reaction to a particular
16:47:40 18 item was positive, negative, or neutral. Right?

16:47:43 19 A. Yes.

16:47:44 20 Q. Who assigns the positive, negative,
16:47:49 21 or neutral grades to each analyst report?

16:47:52 22 A. What does the validity mean? So,
16:47:57 23 the analysts comment about impairments and there
16:48:02 24 is commentary about management changes.

16:48:06 25 The management changes were done by

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16:48:10 1 word matching. Is something neutral, positive or
16:48:14 2 negative?

16:48:14 3 The analysts' work on impairment was
16:48:17 4 quantitative, because at the end of the day they
16:48:21 5 either did or didn't change a target price.

16:48:23 6 So, that is what that was done.

16:48:27 7 And then the staff working under my
16:48:30 8 direction prepared that mapping and then we
16:48:32 9 reviewed it together.

16:48:33 10 Q. When you say that the staff under
16:48:37 11 your direction prepared that mapping, what do you
16:48:40 12 mean by that?

16:48:40 13 A. In other words, the qualitative
16:48:42 14 plus, minus, zero.

16:48:43 15 Q. Okay. So, for the impairment
16:48:47 16 news -- for the RTM impairment news, are you
16:48:48 17 saying that the scoring was done on the basis of
16:48:51 18 whether the analyst changed a price target or
16:48:56 19 evaluation or some other quantitative measure?

16:48:58 20 A. Yes. So, that one is a little
16:49:03 21 easier to explain.

16:49:04 22 The other is more qualitative. You
16:49:06 23 are looking at words.

16:49:07 24 So, as was the case on the other
16:49:09 25 question, I came up with some words. The

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16:49:11 1 phrases, that I thought represented a point of
16:49:13 2 view and tried to match as closely as possible.

16:49:16 3 Q. Okay. Were you applying any sort of
16:49:25 4 industry standards in assessing the positive,
16:49:32 5 neutral or negative score for reactions to the
16:49:34 6 management change?

16:49:37 7 A. I'm not sure what you mean by an
16:49:39 8 industry standard. You mean that people always
16:49:41 9 like or don't like mining CEOs, is that the
16:49:44 10 question?

16:49:52 11 Q. Is your scoring based on any sort of
16:49:55 12 peer reviewed literature?

16:49:56 13 A. There is no peer reviewed literature
16:50:00 14 on something like this. The question is just how
16:50:03 15 do analysts think about a management change.

16:50:05 16 That is really why I'm doing this,
16:50:07 17 is because Dr. Metz has a particular view of the
16:50:10 18 management change in academic literature.

16:50:12 19 So, I do two things: One, he gets
16:50:14 20 the academic literature all wrong.

16:50:16 21 And two, I find very mixed support
16:50:18 22 on the management change.

16:50:19 23 And the best he has done in
16:50:21 24 complaining about it is a couple of the reports
16:50:24 25 around the edges.

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16:50:25 1 So, it is qualitative. I would
16:50:27 2 certainly admit that.

16:50:28 3 Q. Okay. Are you basing this on any
16:50:30 4 sort of other source -- third party source that
16:50:40 5 defines how to score news based on positive,
16:50:46 6 negative, or neutral reaction?

16:50:48 7 MR. KIRSCH: Objection.

16:50:48 8 THE WITNESS: If I'm understanding
16:50:50 9 your question, no, because I don't need to.
16:50:52 10 I'm not using this as a quantitative input or
16:50:55 11 something.

16:50:57 12 It is merely a look at the range of
16:51:00 13 reactions to management change.

16:51:03 14 The part that is grounded in the
16:51:05 15 peer reviewed work is what the academic
16:51:07 16 literature would predict. And it generally
16:51:10 17 predicts the opposite of what Dr. Metz says.

16:51:19 18 BY MR. BEDNAR:

16:51:19 19 Q. And so the assessment of the score
16:51:21 20 that would be received, I want to make sure I
16:51:23 21 understand. Were you determining that score with
16:51:27 22 respect to management change, or was the score
16:51:32 23 assigned in the first instance by someone on your
16:51:34 24 staff?

16:51:34 25 A. At the end of the day, it is me.

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16:51:36 1 So, the staff did the first draft that I had
16:51:39 2 given the key words we agreed on. And then we
16:51:41 3 reviewed it together. But at the end of the day,
16:51:43 4 I am.

16:51:47 5 Q. Okay. And in determining whether
16:51:48 6 you agree with the score that is assigned to the
16:51:53 7 analysts' reaction to management change, were you
16:51:56 8 relying on the excerpts from commentary that are
16:52:01 9 in Appendix C.8, or were you relying on the
16:52:04 10 entire report?

16:52:07 11 A. Understanding your question, I think
16:52:10 12 the commentary is in C.8. In other words, I
16:52:13 13 tried to put the language in that would help the
16:52:17 14 readers see why I did what I did.

16:52:18 15 I am not Dr. Metz. I'm not spelling
16:52:21 16 stuff out. I am giving it all to you and you can
16:52:24 17 judge me accordingly.

16:52:25 18 Q. In determining whether or not you
16:52:27 19 agreed with the score that was assigned to the
16:52:28 20 analysts' reaction to the management change, for
16:52:31 21 any analyst report that is listed here, did you
16:52:34 22 read the entire report or were you relying on the
16:52:37 23 commentary that has been extracted here?

16:52:40 24 A. No, I read the entire report. You
16:52:43 25 see an -- at the beginning of each block of these

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16:52:45 1 you see something that is overall, that indicates
16:52:47 2 a reading holistically.

16:52:50 3 Sometimes I will even comment on the
16:52:52 4 title of the report or something else in the
16:52:53 5 report.

16:52:54 6 So, yes, the whole report is being
16:52:58 7 read.

16:52:58 8 Q. And then -- okay, I think I
16:53:04 9 understand the items that I had questions about
16:53:09 10 there.

16:53:10 11 I don't know if this is something
16:53:20 12 that you kept track of. Do you know how many
16:53:22 13 times you have been hired as an expert witness in
16:53:23 14 a court case?

16:53:25 15 A. Many times.

16:53:30 16 Q. Do you know approximately how many?

16:53:33 17 A. Over what time period?

16:53:34 18 Q. In your career.

16:53:37 19 A. I don't. You can see -- I think the
16:53:41 20 report gives you cases in the last four years.

16:53:45 21 But, I don't recall off the top of
16:53:47 22 my head.

16:53:49 23 Q. Okay. Have ever testified on behalf
16:53:51 24 of plaintiffs in litigation?

16:53:54 25 A. I have.

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16:53:57 1 Q. What kinds of plaintiffs have you
16:53:59 2 testified on behalf of?

16:54:00 3 A. I am currently working a couple of
16:54:04 4 plaintiffs cases now.

16:54:07 5 I have worked on a case in
16:54:10 6 securities where the Maryland Shines was a
16:54:14 7 plaintiff. I'm never sure if the government is
16:54:18 8 the plaintiff or is the defendant, but I have
16:54:19 9 certainly worked for the IRS, the Justice
16:54:22 10 Department.

16:54:22 11 Yes, is the short answer.

16:54:31 12 Q. Have you ever been an expert witness
16:54:33 13 on behalf of shareholders who weren't
16:54:37 14 institutional shareholders?

16:54:38 15 A. You mean an individual shareholder,
16:54:44 16 is that what you are asking? Or a class action,
16:54:46 17 or --

16:54:46 18 Q. Yes, I could have asked that in a
16:54:50 19 less negative way.

16:54:51 20 Have you ever been an expert on
16:54:53 21 behalf of either an individual shareholder or a
16:54:55 22 class of individual shareholders?

16:54:57 23 A. I am currently with an individual
16:55:02 24 shareholder that I can't mention. It is a very
16:55:04 25 large individual shareholder in a very large

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16:55:06 1 company. I don't know that I can disclose it.

16:55:08 2 Q. Okay. Ever worked for any other
16:55:12 3 shareholders besides that one large individual
16:55:14 4 shareholder?

16:55:14 5 A. Again individual shareholders, no,
16:55:19 6 not that I can think of off the top of my head.

16:55:22 7 Q. Okay. And then what about classes
16:55:25 8 of individual shareholders, have you ever worked
16:55:28 9 for a class of individual shareholders?

16:55:30 10 A. Not that I recall. The Merrill
16:55:36 11 Lynch funds case, they were an opt-out from the
16:55:38 12 class. It was the same argument but I was
16:55:42 13 technically not the class.

16:55:45 14 Q. Sure.

16:55:45 15 MR. KIRSCH: And, Tom, just to be
16:55:46 16 clear, you are asking about -- I mean, as you
16:55:49 17 probably know, your typical plaintiff's class
16:55:53 18 is composed of both individuals and
16:55:55 19 institutional shareholders.

16:55:56 20 I'm not sure I have seen a class
16:56:00 21 that -- certainly not many that are composed
16:56:03 22 by definition only of individual
16:56:05 23 shareholders.

16:56:07 24 So, are you asking him about an
16:56:08 25 exclusive individual class?

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16:56:11 1 MR. BEDNAR: That is what I asked.

16:56:11 2 BY MR. BEDNAR:

16:56:13 3 Q. Does that change your answer if I
16:56:14 4 asked about a class whether it was institutional
16:56:18 5 shareholders?

16:56:18 6 A. No.

16:56:20 7 Q. Okay.

16:56:21 8 A. Thank you.

16:56:21 9 (Exhibit Number 1100
16:56:21 10 marked for identification.)

16:56:23 11 BY MR. BEDNAR:

16:56:23 12 Q. I'm going to put up your CV, Doctor.
16:56:26 13 This is marked as Exhibit 1100. It is Appendix A
16:56:29 14 to your report.

16:56:30 15 You list in the field of
16:56:35 16 specialization, natural resource economics.

16:56:37 17 I just wanted to understand what you
16:56:41 18 mean by natural resource economics?

16:56:43 19 A. Earlier in my career I did a lot of
16:56:48 20 work on the economics of oil and natural gas
16:56:51 21 markets, with the way of studying the
16:56:54 22 relationship between spot and contract prices.

16:56:58 23 I actually built some of the early
16:57:00 24 models the Energy and Information Administration
16:57:03 25 used in the Department of Energy back in the late

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16:57:06 1 1970's, early 1980's.

16:57:07 2 So, that is the work under natural
16:57:10 3 resources.

16:57:11 4 Q. Are you offering any opinions in
16:57:13 5 this case as an expert in natural resource
16:57:15 6 economics?

16:57:17 7 A. Nothing I'm offering here is relying
16:57:20 8 on anything that natural resources developed, no.

16:57:25 9 Q. Okay. Page 3 of your CV, lists a
16:57:32 10 number of consulting or advisory relationships.

16:57:36 11 I don't need to ask you about all of
16:57:38 12 those. Rio Tinto is listed.

16:57:45 13 A. It is this case.

16:57:46 14 Q. It is this case. Have you
16:57:47 15 ever worked on Rio Tinto --

16:57:47 16 A. I'm sorry. What the -- what the
16:57:49 17 category means is basically in Columbia
16:57:56 18 University, we always disclose any time you are
16:57:59 19 being paid to do something.

16:58:00 20 So, my own pattern is rather than
16:58:03 21 doing it every few years, which is what is
16:58:06 22 required, I go all of the way back to 2007.

16:58:09 23 So, this is a list that I think many
16:58:11 24 of these, if not most, are probably commercial
16:58:14 25 speaking engagements.

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16:58:15 1 But anytime I was paid to do
16:58:17 2 something, whether it is a matter like this, or I
16:58:21 3 testify for a company, it is on that list. That
16:58:24 4 is how Rio Tinto got there.

16:58:25 5 Q. Okay. So, have you ever been paid
16:58:28 6 to do something by Rio Tinto other than work you
16:58:30 7 may have done in this case?

16:58:31 8 A. I have not.

16:58:32 9 Q. All right. You listed an engagement
16:58:36 10 for Amazon. Was that expert witness work?

16:58:39 11 A. Yes. And some strategy consulting.

16:58:44 12 Q. And, what were the issues in the
16:58:47 13 expert witness work that you did for Amazon?

16:58:51 14 A. It was relating to royalties that
16:58:54 15 would be paid on streaming music. And I worked
16:58:59 16 on projects with them on setting the price on
16:59:03 17 Prime Music and how to grant royalties to
16:59:06 18 songwriters and performers.

16:59:38 19 MR. BEDNAR: Let me go off the
16:59:42 20 record for about five or ten minutes and get
16:59:45 21 organized for the remaining questions I have.

16:59:47 22 I don't think I have too many,
16:59:48 23 Doctor, so I think it would work best if we
16:59:51 24 go off the record.

16:59:53 25 THE WITNESS: Okay.

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16:59:53 1 THE VIDEOGRAPHER: We are going off
16:59:55 2 the record, the time is 4:59 eastern.

17:11:07 3 (Recess taken -- 4:59 p.m.)

17:11:07 4 (After recess -- 5:11 p.m.)

17:11:07 5 THE VIDEOGRAPHER: We are going back
17:11:17 6 on the record. The time is 5:11 eastern.

17:11:24 7 MR. BEDNAR: Before I ask some
17:11:26 8 questions of Dr. Hubbard, I will just put on
17:11:29 9 the record that I have talked with
17:11:31 10 Dr. Hubbard about a variety of analyses that
17:11:33 11 he has recently conducted.

17:11:37 12 I'm going to request production of
17:11:42 13 the materials demonstrating the analytical
17:11:45 14 work that he discussed. We will put that
17:11:48 15 request in writing.

17:11:49 16 Reserve our right to seek additional
17:11:52 17 discovery related to those materials as the
17:11:55 18 defendants have done with respect to
17:11:56 19 Dr. Metz.

17:11:56 20 BY MR. BEDNAR:

17:11:57 21 Q. Dr. Hubbard, I just have a couple of
17:11:59 22 little kind of like cleanup questions to make
17:12:01 23 sure that I understood.

17:12:03 24 The exhibit that we just looked at
17:12:08 25 was your CV. And I asked you about that list of

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17:12:11 1 speaking and consulting engagements since 2007.

17:12:13 2 Right?

17:12:14 3 A. Yes, sir.

17:12:15 4 Q. The one that Rio Tinto was in the
17:12:17 5 list.

17:12:18 6 Does that section of your CV list
17:12:21 7 all of your engagements since 2007?

17:12:26 8 A. Unless I have missed something, they
17:12:28 9 should be in there, yes.

17:12:29 10 Q. Okay.

17:12:31 11 A. But again, engagements could be a
17:12:33 12 speaking. It doesn't have to be expert witness.

17:12:36 13 Q. Sure. If there is a client that has
17:12:38 14 paid you for expert witness services since 2007,
17:12:41 15 it would be listed in that list?

17:12:43 16 A. It would be in that list. Unless I
17:12:46 17 have missed it, it should be in that list.

17:12:48 18 Q. Okay. Going back to something that
17:12:51 19 we discussed probably in the morning, I want to
17:12:54 20 make sure that I understood your answer.

17:12:55 21 Is it your opinion that the price of
17:13:00 22 \$16.50 Australian, does that represent the value
17:13:06 23 of Riversdale with the control premium included
17:13:13 24 as of April 8, 2011?

17:13:15 25 A. Well, it depends on your definition.

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17:13:19 1 Because that is above the
17:13:21 2 preexisting market price, it represents a
17:13:24 3 combination value.

17:13:26 4 If you are buying an asset to change
17:13:29 5 strategy, it requires control for you to do so.
17:13:33 6 So, in that sense I suppose you could say yes, it
17:13:35 7 includes a control premium.

17:13:37 8 But again, I'm not sure it is in the
17:13:39 9 sense that you are using the term. I think that
17:13:42 10 any of that extra price is referring to
17:13:45 11 synergies, ability to change strategies from
17:13:47 12 controlling an assets, et cetera.

17:13:50 13 Q. And I think I'm going to try to ask
17:13:52 14 it in a slightly different way because I think
17:13:54 15 there was something wrong with my question. And
17:13:56 16 I may not be fixing it, but I will try to ask it
17:13:59 17 in a different way.

17:14:00 18 Is it your opinion that \$16.50
17:14:05 19 Australian represents the value of Riversdale
17:14:08 20 plus the control premium?

17:14:09 21 That those two things combined
17:14:11 22 together equals the \$16.50 share price?

17:14:15 23 A. Well, I'm not sure what you mean by
17:14:17 24 value of Riversdale.

17:14:19 25 If you had met the standalone value

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17:14:22 1 of Riversdale, possibly. I mean, if this were
17:14:26 2 Delaware, and we are talking about a corporate
17:14:29 3 valuation to separate a stand-alone versus gains
17:14:32 4 from a merge, what that is supposed to mean, I
17:14:35 5 suppose so. But the question is not very clear
17:14:37 6 to me.

17:14:38 7 Q. Okay. And I also asked you a couple
17:14:42 8 of questions to just sort of understand the way
17:14:44 9 in which the staff that assisted you on the
17:14:48 10 report worked under your direction.

17:14:49 11 Did you always instruct your staff
17:14:57 12 what to do before they did work?

17:15:03 13 A. Yes.

17:15:03 14 Q. So, your staff did not do --

17:15:06 15 Did your staff do any work that the
17:15:09 16 attorneys asked them to do rather than work that
17:15:12 17 you asked them to do?

17:15:14 18 A. Not to my knowledge and certainly
17:15:16 19 not from me, because I directed the individual
17:15:21 20 project. I can't say if they have done something
17:15:23 21 I don't know, but not to my knowledge.

17:15:25 22 Q. And are you aware --

17:15:27 23 Without divulging the contents, are
17:15:29 24 you aware of your staff communicating any
17:15:32 25 findings to the attorneys in this case without

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17:15:36 1 you involved in those communications?

17:15:38 2 A. I can't imagine that that would
17:15:44 3 happen, because I directed them. So, I'm asking
17:15:47 4 them for the findings.

17:15:48 5 If you are asking did they also tell
17:15:50 6 the attorneys before we finalized the report,
17:15:52 7 that I don't know. But, I'm not really sure what
17:15:55 8 you are asking.

17:15:55 9 Q. Okay. So you are not aware of your
17:15:58 10 staff reporting on any findings, of any work that
17:16:07 11 was not done at your direction, right?

17:16:09 12 A. Correct.

17:16:10 13 Q. Okay. Did your staff ever give you
17:16:15 14 recommendations on different directions to take
17:16:21 15 for the work in your report?

17:16:22 16 A. I'm not sure what you mean by a
17:16:27 17 different direction.

17:16:27 18 My typical pattern is to block out
17:16:30 19 an outline and topics and approaches and talk it
17:16:33 20 through.

17:16:34 21 I don't recall anything like a
17:16:35 22 different direction --

17:16:41 23 Q. Okay. And to make sure I understand
17:16:43 24 I will give you an example.

17:16:44 25 Did you conduct any analyses at the

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17:16:48 1 suggestion of your staff?

17:16:51 2 A. Not that I recall, no.

17:16:54 3 Q. So, the -- for instance the
17:16:57 4 different progression analyses that were run as
17:16:59 5 part of your study, it was your idea to run those
17:17:03 6 analyses?

17:17:03 7 A. Yes, because they came from
17:17:06 8 essentially my reading of Dr. Metz's deposition.

17:17:09 9 Q. Okay. The regression analyses that
17:17:14 10 were done as part of your written report, were
17:17:16 11 those all done at your direction?

17:17:18 12 A. They were.

17:17:19 13 Q. Okay. Including the regression
17:17:22 14 analysis that was run on March 29th of 2011?

17:17:27 15 A. Yes. I think, actually there was
17:17:29 16 even a print run-up on it in the paper as having
17:17:40 17 watched. So, yes.

17:17:41 18 Q. Okay. And then I'm sorry to return
17:18:03 19 to something I was just asking you about.

17:18:04 20 But, the issue of your opinion of
17:18:13 21 the \$16.50 per share acquisition price.

17:18:18 22 Do you agree that that represents
17:18:20 23 the approximate fair market value of Riversdale
17:18:28 24 and the control premium that may or may not have
17:18:31 25 been paid?

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17:18:31 1 A. That is a hard question, because I'm
17:18:33 2 not sure what you mean by fair market value.

17:18:35 3 So, there is the notion of a
17:18:38 4 stand-alone fair market value which it clearly
17:18:40 5 isn't.

17:18:40 6 So, basically Rio Tinto is thinking
17:18:43 7 that the asset is worth more than the market
17:18:47 8 price in its hand so it will pay more.

17:18:49 9 And so, in that sense it is adding
17:18:52 10 to the standalone control premium, if that is
17:18:55 11 your question.

17:18:55 12 Q. Okay. And in the context in which
17:19:05 13 you have just used it, what is the standalone
17:19:08 14 value?

17:19:08 15 A. What is the standalone value?

17:19:13 16 Q. I'm sorry. What does that content
17:19:16 17 mean, just to define that term, not to say what
17:19:18 18 it is for Riversdale.

17:19:19 19 A. In other words, a stand-alone value
17:19:21 20 would mean if a company were on its own, with its
17:19:24 21 own management and strategy, resources, that is
17:19:28 22 the fundamental value of the price.

17:19:41 23 MR. BEDNAR: Okay. Dr. Hubbard, I
17:19:42 24 don't have any further questions for you at
17:19:44 25 this time.

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17:19:44 1 If any of the attorneys for the
17:19:46 2 defendants ask you questions, I reserve any
17:19:49 3 time I have left in case there is a need for
17:19:51 4 follow-up.

17:19:52 5 But, I do thank you for your time
17:19:53 6 and your patience so far.

17:19:55 7 A. Thank you, my pleasure.

17:19:59 8 MR. KIRSCH: On behalf of Rio Tinto
17:20:02 9 we have no questions, thank you.

17:20:07 10 MR. CHEPIGA: On behalf of
17:20:09 11 Mr. Elliot, this is Geoff Chepiga, we have no
17:20:11 12 questions.

17:20:12 13 Thank you, Dr. Hubbard.

17:20:14 14 MS. VALLETTE: And on behalf of
17:20:16 15 Mr. Albanese, this is Jackie Vallette, we
17:20:18 16 also have no questions.

17:20:20 17 Thank you for your time today,
17:20:21 18 Dr. Hubbard.

17:20:22 19 THE WITNESS: Thank you.

17:20:24 20 MR. BEDNAR: Thank you, Dr. Hubbard.
17:20:26 21 We can go off the record.

17:20:27 22 MR. KIRSCH: Thank you, Tom. Thank
17:20:29 23 you Glen and Lori for your time and patience
17:20:32 24 today.

17:20:32 25 THE WITNESS: Yes, thanks so much.

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17:20:33 1 And sorry for all of the noise and the
17:20:35 2 drilling and the air con. I apologize.

17:20:38 3 THE VIDEOGRAPHER: This marks the
17:20:40 4 end of the deposition of Dr. Glenn Hubbard.
17:20:42 5 We are going off the record at 5:20 eastern.

17:20:55 6 (Whereupon, signature not having been
7 waived, the deposition suspended at 5:20 p.m.)

8 * * *

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CERTIFICATE OF WITNESS

I, GLENN HUBBARD, PH.D. declare that I have read the entire transcript of my deposition testimony, or the same has been read to me, and certify that it is a true, correct and complete transcript of my testimony given on June 26, 2020; save an except for changes and/or corrections, if any, as indicated by me on the attached Errata Sheet, with the understanding that I offer these changes and/or corrections as if still under oath.

_____ I have made corrections to my deposition.

_____ I have NOT made any changes to my deposition.

Signed _____

GLENN HUBBARD

Dated this _____ day of _____, 2020.

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	Date taken: June 26, 2020		
3	Case: SEC vs. Rio Tinto PLC, et al.		
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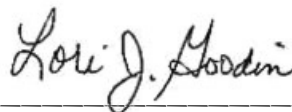
CERTIFICATE OF COURT REPORTER

UNITED STATES OF AMERICA)

DISTRICT OF COLUMBIA)

I, LORI J. GOODIN, RPR, CLR, CRR, the
reporter before whom the foregoing deposition was
taken, do hereby certify that the witness whose
testimony appears in the foregoing deposition was
sworn by me; that the testimony of said witness
was taken by me in machine shorthand and
thereafter transcribed by computer-aided
transcription; that said deposition is a true
record of the testimony given by said witness;
that I am neither counsel for, related to, nor
employed by any of the parties to the action in
which this deposition was taken; and, further,
that I am not a relative or employee of any
attorney or counsel employed by the parties
hereto, or financially or otherwise interested
in the outcome of this action.

Dated: June 26, 2020



LORI J. GOODIN, RPR, CLR, CRR, RSA
Notary Public in and for the
District of Columbia

My Commission expires: May 14, 2021

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EXHIBIT 45



The bond event study methodology since 1974

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Abstract In the spirit of methodology reviews for stock event studies, like the one prepared by Binder (Rev Quant Financ Account 11:111–137, 1998), this paper discusses the development of the event study methodology for corporate bonds since its first application with Katz (J Financ 29:551–559, 1974). The motivation to conduct this review stems from two sources: First, the methodology utilized for stocks cannot simply be applied to bonds, as bonds present several features that strongly distinguish them from stocks. An erroneous model could lead to false conclusions about the impact of new information on a firm's debt. Second, the availability of new sources for bond data enables the application of bond event studies for an increasing number of research frameworks. Thus, future research ought to be interested in the selection of the proper methodology. Consequently, this paper illustrates past and present event study methods utilized to calculate abnormal bond returns and reviews the applied parametric and non-parametric test statistics. Besides, insight on how the availability of corporate bond data has evolved through the last four decades, as well as the impact on prevailing methodology is provided. Altogether, this paper provides a first extensive snapshot of the current bond event study methodology and offers guidance for future research.

Keywords Bond event study · Bonds · Abnormal returns · Methodology review

JEL Classification G12 · G14

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1 Introduction

Since its introduction in 1969 by Fama et al. (1969) the short term event study approach has received many successfully published reviews of its methodology, helping researcher with the selection of the proper model to detect abnormal returns (e.g., Binder 1998; Corrado 2011; Henderson 1990; MacKinlay 1997; Peterson 1989). All of these studies share a focus on the firm's stock prices to measure the short term wealth effects of the examined events. Thus, while researchers have access to a variety of papers describing the development of event studies on stocks over time, as well as the advantages and shortcomings of different procedures, corporate bonds lack such a review. It is the objective of this paper to fill this gap and provide a comprehensive overview for bond event studies. Therefore, papers utilizing bond event studies since its first application by Katz (1974) are collected and reviewed by the authors, which results in a discussion of the transformation of the methodology.

The necessity to produce this review stems from the fact that bonds play a major role in financing companies, but are mostly disregarded when assessing the impact of events on firm value, which can result in incorrect conclusions about the firm wealth effects. Lin et al. (2011), Bessembinder and Maxwell (2008) as well as Edwards et al. (2007) provide initial insights into the importance of the US corporate bond market.¹ At the end of 2006, the outstanding principal in US corporate bonds amounts to \$5.37 trillion and is therefore larger than either US Treasury obligations or municipal bond obligations. Issuance of corporate bonds between 1997 and 2006 is more than three times the number of equity raised through IPO and SEO combined, with a total of \$4.6 trillion. Obtaining trades reported to TRACE (Trade Reporting and Compliance Engine) between January 2003 and January 2005, Edwards et al. (2007) collect a sample of 12,320,016 trades, representing \$9.3 trillion and almost 22,000 non-convertible bonds. Moreover, data from the Securities Industry and Financial Markets Association shows that US corporate public debt offerings between 1990 and 2009 amounted to a total value of \$11.5 trillion, representing approx. 50 % of all US corporate debt financing (Liu and Magnan 2014). Comparing the bond and stock data from Thomson One Banker presents the same pattern: between January 2000 and November 2014 non-financial US-Companies (European-Companies) issued non-convertible bonds with a total principal value of almost \$13 trillion (over €6 trillion). Equity capital raised through initial and secondary offerings, on the other hand, only amounted to slightly more (less) than \$3 trillion (€3 trillion). Despite the undeniable enormous importance of corporate bonds as a source of external financing, most researchers focus solely on stock price behavior to evaluate the impact of various corporate events. Conducting a census of event studies that focus on stock price effects in five top-tier journals² which are published between 1974 and 2000, Kothari and Warner (2005) find a total number of 565 articles. While the authors are unaware of the exact number of event studies on stocks, it is safe to say that the actual figure is considerably higher, probably several thousands. Bond price effects, however, play a subordinate role in corporate finance research.

Nevertheless, over the last four decades several empirical papers applied event study methodology to investigate the impact of various events, such as mergers and acquisitions, rating changes, or earnings announcements on bondholder wealth effects. This

¹ Primary market for bond event studies are the United States.

² Journal of Business, Journal of Finance, Journal of Financial Economics, Journal of Financial and Quantitative Analysis, and Review of Financial Studies.

Table 1 Prior event study research with corporate bond data

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Campbell et al. (2015)	Inside debt	Bonds Stocks CDS	2006–2009	277 observations	Matching portfolio	Bond returns	–	Bond with largest number of units traded	TRACE	Daily	WP
Jiang and Sun (2015)	Macroeconomic and firm- specific news	Bonds	2002–2011	6069 bonds 714 firms	Matching portfolio	Bond returns	–	Value weighted	TRACE	Daily	WP
Tsai and Wu (2015)	Dividends	Bonds Stocks	2005–2012	5143 events based on institutional- sized bond trades 5246 events based on all bond trades	Mean adjusted	Premium returns	t-statistic	Most actively traded	TRACE	Daily	–
Bittingmayer and Moser (2014)	–	Bonds	2002–2008	675 bonds	Matching portfolio	Bond returns	–	All	TRACE FISD	Monthly	–
Chen (2014)	Dividends	Bonds Stocks	2002–2010	1513 observations (272 decreases and 1241 increases)	Matching portfolio	Bond returns	t-statistic Signed rank	Value weighted	TRACE FISD	Daily	WP
Houston et al. (2014)	Loan defaults	Bonds	2002–2010	232 defaulted loans from 179 companies 2507 affected loans from 1696 companies	Matching portfolio	Bond returns	–	All	TRACE NAIC FISD	Daily	WP
Kedia and Zhou (2014)	M&A	Bonds	1994–2006	329 bonds 123 firms	Matching portfolio	Bond returns	–	All Value weighted	TRACE NAIC FISD	Monthly	JFM

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Quijano (2014)	SCAP results	Bonds	2009	127 bonds 12 banks	Matching portfolio	Bond returns	t-statistic Signed rank	Value weighted	TRACE FISD	Daily	–
Chen et al. (2014)	Ratings	Bonds	2005	57 upgraded bonds	Matching portfolio	Bond returns	– Sign test	Value weighted	TRACE FISD	Daily	WP
DeFond and Zhang (2014)	Earnings	Bonds Stocks	1996–2006	11,641 announcements 710 firms	FF factor model CDGM factor model	Bond spreads Yield spreads	t-statistic	Value weighted	Datstream FISD	Daily	CAR
Fortin et al. (2014)	Shareholder proposals	Bonds Stock	1996–2006	689 bonds of 86 PSP firms 219 bonds of 27 NPSP firms	Matched government bond	Bond returns	t-statistic z-statistic	Value weighted 1. level: Highest average daily trades 2. level: Highest number of trading days	TRACE	Daily	–
Kwan and Aranda León (2014)	Strategic alliances	Bonds Stocks	2003–2007	467 announcements	Market model with Matching portfolio	Bond returns	Sign Signed rank	Value weighted	TRACE FISD	Daily	WP
Lemmon et al. (2014)	Asset Securitization	Bonds Stocks	1996–2009	65 firms 185 bonds	Matching portfolio	Bond returns	t-statistic Signed rank	Equally weighted	Datstream	Daily	JF
Chen (2013)	Debt issue	Bonds Stocks	2005–2011	1356 debt offerings 859 firm level offerings	Matching portfolio	Bond returns	t-statistic Signed rank	Equally weighted	TRACE FISD	Daily	WP

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Li et al. (2013)	Collapse of Bear Stern and Lehman Brothers	Bonds	2007–2009	309 firms 689 bonds	Mean adjusted	Premium returns	t-statistic	All	TRACE FISD	Daily	–
Plunus et al. (2012)	Operational loss	Bonds	1994–2006	71 losses by 41 firms	Market model	Bond returns	t-statistic	Longest maturity	Datstream	Daily	–
Pu (2012)	Pension fund activism	Bonds Stocks	2002–2009	25 firms	Market adjusted	Bond returns	–	Value weighted	TRACE FISD	Daily	WP
Autore et al. (2011)	Short sale ban	Bonds Stocks	2008	59 firms	Matching portfolio	Bond returns	t-statistic Signed rank	Equally weighted	TRACE	Daily	JBF
Bhat et al. (2011)	MBS holdings	Bonds Stocks	2006–2010	28 banks 480 bonds	Market adjusted	Bond returns	t-statistic z-statistic	–	–	Daily	JAE
Billings et al. (2011)	Shareholder lawsuits	Bonds	1996–2008	579 firms	Paired comparison	Bond returns	t-statistic Signed rank	Representative	TRACE FISD	Daily	WP
Blaylock et al. (2011)	Government intervention	Bonds Stocks	2009	265 firms 575 bonds	Market adjusted	Bond returns	–	Equally weighted	TRACE	Daily	WP
Cho et al. (2011)	Ratings	Bonds	2002–2006	759 upgrades 2025 downgrades	Matching portfolio	Bond returns	t-statistic Signed rank	All	TRACE	Daily	WP
Clayton (2011)	IPO	Bonds	1983–2007	70 IPOs	Matching portfolio	Bond returns	–	Value weighted	LBBD NAIC TRACE FISD	Monthly	WP
DeFond et al. (2011)	SOX-related events	Bonds	2002	2671 bonds	CDGM factor model Zhang factor model	Yield spreads	t-statistic	All	Datstream	Daily	–

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Ellul et al. (2011)	Fire sales	Bonds	2001–2005	356 bonds 173 firms	Simple market model Matching portfolio Mean adjusted	Bond returns	t-statistic	All Random	NAIC FISD	Weekly	JFE
Gao et al. (2011)	Dodd Frank Act of 2010	Bonds Stocks	2009–2010	31 firms	Matching portfolio	Bond returns	t-statistic	Equally weighted Value weighted	TRACE FISD	Daily	WP
Klein and Zur (2011)	Hedge fund activism	Bonds Stocks	1994–2006	189 bonds short run 193 bonds long run	Matching portfolio	Bond returns	t-statistic Signed rank	Most recently issued Weighted	TRACE FISD	Daily	RFS
Marble (2011)	Ratings	Bonds	2002–2005	49 downgrades 20 upgrades	Matching portfolio	Bond returns	t-statistic Signed rank	Value weighted	TRACE	Daily	–
Massa and Zhang (2011)	Natural catastrophe	Bonds	1998–2008	1583 bonds 564 firms	Mean adjusted	Premium returns	t-statistic	–	BoA Merrill Lynch TRACE FISD	Daily Monthly	WP
Nishikawa et al. (2011)	Repurchases	Bonds Stocks	1994–2002	666 repurchases 359 firms	VPE for yield spreads	Yield spreads	t-statistic Signed rank	Largest combined trading volume	FISD	Daily	–
Okamoto et al. (2011)	LBO	Bonds Stocks	2007–2008	67 bonds 28 firms	Mean adjusted	Premium returns	t-statistic	Value weighted	Datstream FISD	Daily	–

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Wei and Yermack (2011)	Inside debt	Bonds Stocks CDS Exchange-traded options	2007	299 firms	Two index market model	Bond returns	t-statistic	Most heavily traded	Reuters TRACE FISD	Daily	RFS
Aslan et al. (2010)	Hedge fund activism	Bonds Stocks	1996–2008	558 firms 732 bonds	Matching portfolio	Bond returns	t-statistic	All Value weighted Median time to maturity	TRACE FISD Datastream	Daily	WP
Baran and King (2010)	LBO	Bonds Stocks	1981–2006	363 bonds 202 bids	Matching portfolio	Bond returns	t-statistic Signed rank	Standard error adjustment	FIDB Bond Record FISD Bloomberg	Monthly	JBF
Billett et al. (2010)	LBO	Bonds Stocks	1980–2006	49 bonds 18 firms	Matching portfolio	Bond returns	t-statistic	Weighted by bonds outstanding	Bond Record TRACE FISD	Monthly	JCF
Choi et al. (2010)	M&A	Bonds Stocks	1995–2002	147 mergers	EMW model	Yield spreads Bond spreads	z-statistic	Value weighted	Datastream LBBB Reuters	Weekly	JMCB
Francis et al. (2010)	Antitakeover laws	Bonds Stocks	1990–2000	489 firms 1857 bonds	Mean adjusted	Premium returns	z-statistic Signed rank	All Value weighted	FISD SDC LBBB	Monthly	JFE
Kitsabumratt-Chatjuthamard et al. (2010)	LREO	Bonds Stocks	1973–1997	66 exchange offer, 190 bonds 93 swap offer, 258 bonds	Mean adjusted	Premium returns	t-statistic Signed rank	Value weighted	LBBB	Monthly	–

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
May (2010)	Ratings	Bonds Stocks	2002–2009	1769 rating changes	Matching portfolio	Bond returns	t-statistic Signed rank	Value weighted	TRACE	Daily Monthly	JBF
Michayluk and Zhao (2010)	Stock splits	Bonds	1999–2006	136 firms	Mean adjusted	Premium returns	t-statistic Signed rank	Most frequently traded	Bridge Datastream Bloomberg	Daily	–
Adams and Mansi (2009)	CEO turnover	Bonds Stocks	1973–2000	674 events 415 firms	Mean adjusted	Yield spreads	t-statistic	Value weighted	FIDB Bloomberg	Monthly	JBF
Bessembinder et al. (2009)	M&A	Bonds Stocks	2002–2006	50 firms	Mean adjusted Matching portfolio	Premium returns Bond returns	t-statistic Signed rank	Value weighted	LBBD TRACE FISD	Daily Monthly	JFE
Cornil (2009)	Restatements	Bonds	2000–2002	49 firms 143 bonds	Mean adjusted	Yield spreads	Sign t-statistic	–	–	Daily	–
Dbouk and Kryzanowski (2009)	Bond index revision	Bonds Stocks	1987–1997	25 additions 58 deletions	Market model with event month dummy Two index market model with event month dummy Unconditional three factor model with event month dummy	Bond returns	t-statistic Signed rank	All	FIDB	Monthly	–

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Elliott et al. (2009)	SEO	Bonds Stocks	1990–2002	188 bonds 68 firms	Mean adjusted	Premium returns	t-statistic	All Value weighted	Tradeline WSJ Manual	Daily	JBF
Kedia and Zhou (2009)	M&A	Bonds Stocks	1994–2006	118 firms 299 bonds	Matching portfolio	Bond returns	t-statistic Signed rank	All Value weighted	FISD NAIC	Daily	WP
Ongena and Penas (2009)	M&A	Bonds Stocks	1998–2002	96 mergers 91 bidder, 781 bonds 18 targets, 117 bonds	Matching portfolio	Bond returns	t-statistic	Value weighted	Datstream	Daily	JFS
Shin et al. (2009)	Ratings	Bonds	1996–2003	131 rating changes	Mean adjusted	Premium returns	t-statistic z-statistic	Equally weighted	NEEDS	Daily	WP
Amromin et al. (2008)	Dividend tax cut	Bonds Stocks	2003	98 High dividend 109 Low dividend	Two index market model	Bond returns	–	–	–	Monthly	FM
DeFond and Zhang (2008)	Earnings	Bonds Stocks	1994–2006	11,525 announcements 690 firms	DFHKZ factor model EGB factor model	Bond spreads	t-statistic	Value weighted	Datstream FISD	Daily	WP
Eberhart et al. (2008)	R&D intensity	Bonds Stocks	1990–1998	83 announcements 41 firms 218 bonds	EGB factor model	Bond spreads	–	Value weighted	SDC LBBID	Monthly	JAR
Ongena et al. (2008)	Loan deals	Bond Stocks	1997–2003	896 deals 364 firms	CDGM factor model	Bond spreads	–	–	Datstream	Daily	WP
Shi and Zhang (2008)	Restatements	Bonds	1997–2003	50 firms 137 bonds	Matched government bond	Bond returns	t-statistic Signed rank	All Firm level	NAIC TRACE	Daily	WP

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Veld and Veld-Merkoulova (2008)	Spin-offs	Bonds Stocks	1995–2002	91 spin-offs 355 bonds	Mean adjusted	Premium returns	z-statistic Signed rank	All Median return	Datstream Bloomberg	Daily	FM
Cai et al. (2007)	Debt issue	Bonds	1995–1999	2975 corporate bond issues (439 bond IPOs by 421 firms and 2536 SBOs by 979 firms)	Matching portfolio	Bond returns	t-statistic	–	NAIC FISD FIDB Bond Record	Daily	RFS
Newberry and Parthasarathy (2007)	Restatements	Bonds	1997–2002	328 Debt issuances-Unique firms 640 Debt issuances-Non-unique firms	Pre- and Post-yield spread difference	Yield spreads	t-statistic	All	FISD	Yearly	WP
Renneboog and Szilagyi (2007)	M&A	Bonds Stocks	1995–2004	225 bidders 24 targets	Matching portfolio	Bond returns	Signed rank	Value weighted	Reuters	Monthly	WP
Dalocchio et al. (2006)	Ratings	Bonds	2000–2004	35 rating changes	Stationarity test GR methodology	Relative Spreads	t-statistic	–	Merrill Lynch	Daily	–
Minnick and Zhao (2006)	Repurchases	Bonds Stocks	1985–2005	1510 repurchases	Mean adjusted	Premium returns	t-statistic	All Value weighted	LBBD	Monthly	WP
Billett et al. (2004)	M&A	Bonds Stocks	1979–1997	940 mergers 831 bidders, 3083 bonds 256 targets, 818 bonds	Matching portfolio	Bond returns	t-statistic Signed rank	Value weighted	FIDB	Monthly	JF

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Devaney and Lizieri (2004)	Divestment	Bonds stocks	1999–2001	8 deals 6 firms	Market model Extended market model	Bond returns	–	–	Datstream GDMO	Weekly	–
Dittmar (2004)	Spin-offs	Bonds	1983–1995	16 spin-offs	Market model	Bond returns	–	–	FIDB	Monthly	–
Penas and Unal (2004)	M&A	Bonds Stocks	1991–1997	66 merger 282 bonds	Matching portfolio	Bond returns	t-statistic	Value weighted	FIDB	Monthly	JFE
Datta et al. (2003)	Divestment	Bonds Stocks	1982–1992	209 firms	Mean adjusted	Premium returns	Sign	Most frequently traded	WSJ Bond Record	Daily	JBF
Maxwell and Rao (2003)	Spin-offs	Bonds Stocks	1976–1997	80 spin-offs	Mean adjusted	Premium returns	t-statistic Signed rank	All Value weighted	LBBD	Monthly	JF
Maxwell and Stephens (2003)	Repurchases	Bonds Stocks	1980–1997	945 repurchases 2817 bonds	Mean adjusted	Premium returns	t-statistic Signed rank	All Value weighted	LBBD	Monthly	JF
Eberhart and Siddique (2002)	SEO	Bonds Stocks	1980–1992	189 SEOs 140 firms	Matching portfolio EGB factor model	Bond returns	Sign	–	FIDB	Monthly	RFS
Gropp and Richards (2001)	Ratings	Bonds Stocks	1989–2000	129 rating changes 30 banks	Market model	Bond returns	t-statistic	All	Bloomberg	Daily	–
Steiner and Heinke (2001)	Ratings	Bonds	1985–1996	546 rating changes 182 watchlistings 216 bonds 111 firms	Matched government bond	Bond returns	t-statistic Signed rank Corrado	One bond per issuer	DFDB Euromoney Bondware	Daily	–

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Brewer and Jackson (2000)	Market maker withdrawal	Bonds Stocks	1990	3 junk bond portfolios	Market model with event day dummy	Portfolio returns	–	–	Merrill Lynch	Daily	JFSR
Kliger and Sarig (2000)	Ratings	Bonds Stocks	1982	812 bonds	Return minus yield	Bond returns	–	Most recently issued	FIDB	Monthly	JF
Easterwood (1998)	Divestment	Bonds	1986–1990	134 divestments 110 bonds 41 firms	Return minus high yield index	Bond returns	t-statistic Signed rank	All Value weighted Equally weighted	Bond Guide	Monthly	JBF
Maquieira et al. (1998)	M&A	Bonds Preferred Convertibles	1963–1995	1283 securities 520 firms 260 mergers	VPE	Yields	t-statistic Signed rank	–	Moody's Manual	Monthly	JFE
Akhiqbe et al. (1997)	Debt issue	Bonds Stocks	1980–1992	574 issues 256 firms	Matching portfolio Mean adjusted	Bond returns Premium returns	t-statistic	–	CFC Dow–Jones Reuters	Weekly	FM
Hite and Warga (1997)	Ratings	Bonds	1985–1995	>2800 bonds >1200 firms	Matching portfolio	Bond returns	t-statistic Signed rank	Equally weighted	Lehman	Monthly	–
Hotchkiss and Mooradian (1997)	Public debt/ equity purchase	Bonds Stocks	1991–1993	63 purchases 39 firms	Mean adjusted	Bond returns	z-statistic	Equally weighted	IDC Salomon Brothers	Daily	JFE
Datta and Iskandar-Datta (1996)	Divestment	Bonds Stocks	1983–1990	73 sell-offs 54 firms	Mean adjusted	Premium returns	z-statistic	Most frequently traded	WSJ Bond Record	Daily	–
Datta and Iskandar-Datta (1996)	M&A	Bonds Stocks	1982–1990	63 mergers 43 firm	Mean adjusted	Premium returns	t-statistic Sign	Most frequently traded	WSJ Bond Record	Daily	JBF

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Brown et al. (1994)	Asset sales	Bonds Stocks	1979–1988	22 asset sales	Mean adjusted	Bond returns	t-statistic	Value weighted	WSJ	daily	JCF
Cook and Easterwood (1994)	Debt issue	Bonds Stocks	1988–1989	170 firms 877 bonds	Matching portfolio	Bond returns	t-statistic	Equally weighted	Bond Guide	Monthly	JF
Dhillon and Johnson (1994)	Dividends	Bonds Stocks	1978–1987	131 firms	Mean adjusted	Premium returns	t-statistic Signed Rank	Most frequently traded	WSJ DRI	Daily	JF
Walker (1994)	M&A	Bonds	1980–1988	65 mergers 92 firms	Matched government bond	Bond returns	t-statistic	Value weighted	Bond Guide	Monthly	–
Datta and Dhillon (1993)	Earnings	Bonds Stocks	1984–1990	250 announcements 135 firms	Mean adjusted	Premium returns	Signed rank Sign	–	DRI WSJ Bond Record	Daily	JFQA
Kahan and Tuckman (1993)	Covenant changes	Bonds Stocks	–	42 changes	Matched government bond	Bond returns	t-statistic	–	Salomon Brothers Bear Stern IDC Bloomberg Moody's S&P's	Daily Monthly	–
Warga and Welch (1993)	LBO	Bonds Stocks	1985–1989	43 bonds 16 firms	Matching portfolio	Bond returns	t-statistic	–	Lehman	Monthly	RFS
Cook et al. (1992)	MBO	Bonds	1981–1989	29 MBOs 62 bonds	Matching portfolio Market adjusted	Bond returns Premium returns	t-statistic Sign	Equally weighted	CFC WSJ	Weekly	FM

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Hand et al. (1992)	Ratings	Bonds Stocks	1977–1983	1301 bonds 624 firms	Matched government bond	Bond returns	t-statistic Binomial test	Equally weighted (max 5 bonds per firm)	IDC	Daily	JF
Wansley et al. (1992)	Ratings	Bonds	1982–1984	351 rating changes 255 firms	Market adjusted	Bond returns	t-statistic	One bond selected	Merrill Lynch	Weekly	–
Crabbe (1991)	Ratings	Bonds	1983–1988	56 bonds	Matching portfolio	Bond returns Yields	t-statistic	Value weighted	Bond Guide	Monthly	JF
Gupta and Rosenthal (1991)	Leveraged recapitalization	Bonds Stocks	1984–1988	–	Market adjusted	Bond returns	t-statistic Binomial test	Equally weighted	WSJ DRI	Daily	FM
Handa and Radhakrishnan (1991)	Leveraged recapitalization	Bonds Stocks	1984–1989	26 bonds 19 firms	Mean adjusted	Bond returns	t-statistic Signed rank	Max 2 bonds per firm	IDC	–	FM
Rathinasamy et al. (1991)	M&A	Bonds	1970–1984	49 mergers 146 bonds	Mean adjusted	Premium returns	t-statistic	All	Bond Guide BQR	Monthly	–
Asquith and Wizman (1990)	LBO	Bonds Stocks	1980–1988	214 bonds 65 firms	Matching portfolio	Bond returns	t-statistic	Random Median time to maturity	Bond Guide IDD Bloomberg	Monthly	JFE
DeFusco et al. (1990)	Stock option plans	Bonds Stocks	1978–1982	36 announcements 34 firms	Matching portfolio	Bond returns	t-statistic Signed rank	One bond selected	WSJ	Daily	JF
Cornett and Travlos (1989)	Exchange offer	Bonds Stocks	1973–1983	11 firms debt-for-equity 56 firms equity-for-debt	Mean adjusted	Bond returns	z-statistic	–	WSJ Bond Guide	Daily	JF

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Marais et al. (1989)	LBO	Bonds Stocks Preferred	1974–1985	290 LBOs 264 firms	Two index market model	Bond returns	z-statistic	Value weighted	Bond Record	Daily	JFE
Jayaraman and Shastri (1988)	Dividends	Bonds Stocks	1962–1982	154 bonds 63 firms	Mean adjusted	Premium returns	z-statistics	Most frequently traded	WSJ Manual Bond Record	Daily	JFQA
Kolodny and Suhler (1988)	Debt issue	Bonds Stocks	1973–1981	66 bonds	Paired comparison	Bond returns	t-statistic	One bond selected	Bond Record	Monthly	–
Kalay and Shimrat (1987)	SEO	Bonds Stocks	1970–1982	58 SEOs	Mean adjusted	Premium returns	z-statistic	Most frequently traded	IDC Bond Record	Daily	JFE
Strong and Meyer (1987)	Writedown	Bonds Stocks	1981–1985	32 bonds 32 firms	Matched government bond	Bond returns	t-statistic Sign	Equally weighted	WSJ	Daily	JF
Dennis and McConnell (1986)	M&A	Bonds Stocks Preferred	1962–1980	132 mergers 81 targets 94 bidders	Mean adjusted Matching portfolio	Bond returns	t-statistic	Equally weighted	WSJ Bond Guide	Daily	JFE
Wansley and Claretie (1985)	Ratings	Bonds Stocks	1981–1983	54 firms	Matching portfolio	Bond returns	t-statistic	–	Bond Guide	Monthly	–
Handjinicolaou and Kalay (1984)	Dividends	Bonds	1975–1976	1967 announcements 255 bonds	Mean adjusted	Premium returns	t-statistic	Most frequently traded	WSJ	Daily	JFE
Settle et al. (1984)	M&A	Bonds	1961–1977	53 mergers 90 bonds 58 firms	Term adjustment procedure	Adjusted returns	t-statistic	–	Bond Record CFC	Monthly	–
Chow (1983)	1933 and 1934 Securities Act	Bonds Stocks	1933–1935	38 bonds	Matching portfolio	Bond returns	Rank sum	One bond selected	WSJ	Daily	AR

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Eger (1983)	M&A	Bonds Stocks	1958–1980	38 mergers 39 firms 41 bonds	Matching portfolio	Jump returns Continuous returns	t-statistic	Largest trading volume	WSJ	Daily	JFQA
Hite and Owers (1983)	Spin-offs	Bonds Stocks Preferred	1963–1981	53 securities 31 firms	Mean adjusted	Bond returns	z-statistic	–	Compuserve WSJ	Daily	JFE
Woolridge (1983)	Dividends	Bonds Stocks Preferred	1970–1977	94 announcements 248 bonds 45 firms	Mean adjusted	Bond returns	t-statistic	Equally weighted	WSJ Bond Guide	Daily	JF
Asquith and Kim (1982)	M&A	Bonds Stocks	1960–1978	50 firms 62 bonds	Paired comparison	Bond returns	t-statistic	Equally weighted	BQR WSJ Bond Guide	Daily Monthly	JF
Dann (1981)	Repurchases	Bonds Stocks Preferred	1962–1976	51 repurchases 122 securities	Mean adjusted	Bond returns	t-statistic	–	WSJ Bond Guide	Daily	JFE
Mikkelsen (1981)	Call options	Bonds Stocks Convertibles	1961–1978	27 bonds 19 convertibles	Announcement week return minus average	Bond returns	t-statistic	Equally weighted	Barrons	Weekly	JFE
Masulis (1980)	Exchange offers	Bonds Stocks Preferred	1962–1976	17 offers 23 securities	Mean adjusted	Bond returns	t-statistic	Equally weighted	WSJ Bond Guide	Daily	JFE
Weinstein (1978)	Debt issue	Bonds	1962–1974	179 issues	Matching portfolio	Bond returns	t-statistic	All	–	Monthly	JF
Kim and McConnell (1977)	M&A	Bonds	1960–1973	39 firms 44 bonds	Paired comparison Two index market model	Bond returns	t-statistic	–	Bond Guide	Monthly	JF

Table 1 continued

Author(s)	Area under investigation	Securities	Period	Number of Obs.	Event study model	Yields/ bond returns	Test statistics	Multiple bonds	Database	Frequency	Journal
Warner (1977)	Bankruptcy	Bonds	1930–1955	20 firms 73 bonds	Two parameter model Matching portfolio	Bond returns	t-statistic	–	BQR Manual	Monthly	JFE
Weinstein (1977)	Ratings	Bonds	1962–1974	123–315 bonds	Matching portfolio	Bond returns	t-statistic	All	BQR Bond Record Nat. Bond Summary Bond Guide	Monthly	JFE
Grier and Katz (1976)	Ratings	Bonds	1966–1972	66 firms 96 bonds	Matching portfolio	Bond returns	Sign test	–	BCC NYSE Library	Monthly	–
Katz (1974)	Ratings	Bonds	1966–1972	66 firms 115 bonds	Factor model	Yields	t-statistic	2 bonds per firm	Bond Guide	Monthly	JF

This table provides an overview of research studies that calculate event studies using bond data. Abbreviations in the event study model column are: *CDGM* Collin-Dufresne, Goldstein, and Martin (2001), *DPHKZ* DeFond, Hung, Karaoglu, and Zhang (2008), *EGB* Elton, Gruber, and Blake (1995), *EMW* Eckbo, Maksimovic, and Williams (1990), *FF* Fama and French (1993), *GR* Gropp and Richards (2001), *VPE* Valuation prediction error. Sources of bond price data include: *BCC* Baruch College Center for Financial Research Utility Data Base, *BoA Merrill Lynch* Bank of America Merrill Lynch US Corporate and High Yield Master bond index database, *Bond Guide* Standard and Poor's Bond Guide, *Bond Record* Moody's Bond Record, *BQR* Bank Quotation Record, *CFC* Commercial and Financial Chronicle, *DFDB* Deutsche Finanzdatenbank, *Dow-Jones* Dow-Jones News Retrieval, *DRI* Data Resources Inc., *IDC* Interactive Data Corporation, *IDD* Investors Dealers Digest, *LBBD* Lehman Brothers Bond Database, *FTDB* Lehman Brothers Fixed Income Database, *FISD* (Mergent) Fixed Income Security Database, *GDMO* Government's Debt Management Office, *Manual* Moody's Industrial Manual, *NAIC* National Association of Insurance Commissioners, *Nat. Bond Summary* The National Bond Summary, *NEEDS* NEEDS-Financial Quest, *NYSE Library* New York Stock Exchange Library, Salomon = Salomon Brothers, *SDC* Securities Data Corporation, *TRACE* Trade Reporting and Compliance Engine, *WSJ* Wall Street Journal, Journals are: *AR* Accounting Review *CAR* Contemporary Accounting Research, *FM* Financial Management, *JAE* Journal of Accounting and Economics, *JAR* Journal of Accounting Research, *JBF* Journal of Banking and Finance, *JCF* Journal of Corporate Finance, *JF* Journal of Finance, *JFQA* Journal of Financial and Quantitative Analysis, *JFE* Journal of Financial Economics, *JFM* Journal of Financial Markets, *JFS* Journal of Financial Stability, *JFSR* Journal of Financial Service Research, *JMCB* Journal of Money, Credit and Banking, *RFS* Review of Financial Studies, *WP* Working Paper

development was partly driven by the improved data availability through new and superior databases. However, researchers faced a number of challenges related to bond data and the estimation of abnormal bond returns. Consequently, numerous approaches and methodologies as well as theoretical refinements have been proposed until today aimed at improving the calculation of bond event study results. This paper reviews solely the developments of methodology applied in event studies for bonds. The intention is to provide a thorough overview of research related to bond event studies, and to highlight the most prevailing and important methodologies based on the available research literature. Furthermore, the guidance that has been provided by researchers for the issues encountered in bond event studies is discussed and assessed. Thereby, this paper provides valuable insight into the evolution of the event study methodology and some guidance for subsequent studies.

Overall, 118 research papers are found that deal with bond event studies. Table 1 below provides an overview, including the utilized event (Column 2), examined securities (Column 3), period (Column 4), sample size (Column 5), applied methodology (Column 6) and price data (Column 7) for calculating abnormal bond returns and testing for their statistical significance (Column 8), adjustment(s) for multiple bonds (Column 9), database (Column 10), and data frequency (Column 11). Column 12 specifies, whether the paper was published in one of 15 top finance and accounting journals³ including (in alphabetic order) *Accounting Review* (AR), *Contemporary Accounting Research* (CAR), *Financial Management* (FM) *Journal of Accounting and Economics* (JAE), *Journal of Accounting Research* (JAR), *Journal of Banking and Finance* (JBF), *Journal of Corporate Finance* (JCF), *Journal of Finance* (JF), *Journal of Financial and Quantitative Analysis* (JFQA), *Journal of Financial Economics* (JFE), *Journal of Financial Markets* (JFM), *Journal of Financial Stability* (JFS), *Journal of Financial Services Research* (JFSR), *Journal of Money, Credit and Banking* (JMCB), and *Review of Financial Studies* (RFS), was published in a less prestigious journal (–), or is available as a working paper (WP).

The remainder of this paper is organized as follows. The following Sect. 2 analyses bond characteristics and their effect on event study methodology. Section 3 provides a detailed overview of the methodologies utilized to compute abnormal bond returns. Section 4 discusses the most popular parametric and non-parametric test statistics for bond event studies and which adjustments improve their statistical validity. Section 5 outlines the different databases utilized to obtain bond data, and discusses the pros and cons of these while Sect. 6 concludes.

2 Bond characteristics affecting event study methodology

2.1 Illiquidity of bond price data

Comparing the bond market with the stock market for liquidity yields two general results: On average, government bonds possess a higher liquidity than stocks (Chordia et al. 2005), yet corporate bonds are rather illiquid compared to stocks. Most US corporate bonds trade less than once a year, as compared with the equity market, where the median stock trades once every few minutes (Mahanti et al. 2008). Examining the frequency of trade of US corporate bonds during the period 2000–2005, Mahanti et al. (2008) detect that over 40 %

³ The journal has to have a 5-Year Impact Factor of 1.5 or higher in the 2013 JCR Social Science Edition to count as a top journal.

from a sample of roughly 19,000 bonds do not trade once a year, while less than 0.032 % trade approximately every day. Corroborating the illiquidity in corporate bond markets, although to a weaker extent, Bessembinder et al. (2009) find an average trading of 52 days a year for TRACE data. The level of infrequent trading is confirmed by Bao et al. (2011), showing a statistically and economically significant illiquidity measure⁴ for bond transaction data from 2003 to 2009, as well as by Chen et al. (2010).

This inherent illiquidity reflects the institutional nature of corporate bond markets where securities are held primarily by long-term buy-and-hold investors (i.e. pension funds, insurance companies, etc.) with extremely low portfolio turnovers (Mahanti et al. 2008). According to Schultz (2001), insurance companies hold almost 40 % of outstanding investment-grade bonds, which illustrates the immense influence on bond liquidity.

Since illiquid data has implications for event study methods, causing poorly specified statistical tests (see Cowan and Sergeant 1996 for further details) most bond event studies impose trading restrictions to accommodate this infrequent trading. Usually researchers demand a certain number of trading days during an interval prior, during and/or after the event. For instance, May (2010) requires that a bond trades on at least 10 of the 20 days starting 30 days after the event day and that it trades on the day before and after the event day. Another approach is provided by Maquieira et al. (1998). They argue that the utilization of yield spreads would mitigate the infrequent trading problem that characterizes daily bond transactions. Thus, they state that calculating bond returns requires two fairly close consecutive prices, whereas one data point is sufficient to calculate its yield making the first more vulnerable to infrequent data. While their reasoning is coherent, they do not provide any empirical evidence that bond event studies would significantly benefit from the utilization of yield spreads in place of returns.

2.2 Multiple bonds outstanding per company

Obtaining trades reported to TRACE between 2003 and 2005, Edwards et al. (2007) observe an average number of over nine bonds outstanding per issuer, as well as a median number of two. This suggests a skewed distribution with a large number of companies having only a small number of bonds outstanding and a small number of firms with much more issues outstanding. In contrast to abnormal stock returns, researchers investigating bondholder wealth effects are presented with the question as to which bond to choose. So far, several methodologies have been utilized to overcome this discrepancy (see Table 1). Bessembinder et al. (2009) differentiate between these procedures: (1) the bond level approach, (2) the representative bond approach, and (3) the firm level approach.

With the bond level approach each bond is treated as a separate observation. This approach causes clustered data because the bond data can be classified into a number of different clusters (i.e. firms), each of which contains multiple observations (i.e. bonds). This clustering biases the standard errors downward because of the likely high correlation among bonds from the same firm, violating the assumption of independent observations and leading to an inflated t-statistic (Eberhart and Siddique 2002). Non-parametric tests, like the Wilcoxon signed rank-test, provide no real alternative. The assumption for the applicability of non-parametric tests is that all observations are independent (Datta and Satten 2005). However, investigating the effect of dependence among observations on the

⁴ The amount of price reversal as captured by the negative of the autocovariance of price changes.

sign-, Wilcoxon signed rank-, and *t*-test, Gastwirth and Rubin (1971) note that the sign test is the least affected while the *t*-test is most affected. Researchers have developed several adjustments for existing parametric and non-parametric test statistics to account for the within-cluster correlation: Modifications of the Wilcoxon signed rank-test have been developed by Rosner et al. (2006) as well as Datta and Satten (2008), and for the *t*-test by Subbaiah and Xia (2007). These tests could be used to mitigate the correlation issue without the need to reduce the sample. However, no bond event study has utilized these modifications so far. An exploration of that is left for future research.

Another drawback of the bond level approach is that firms with more than one bond tend to be overrepresented. Bessembinder et al. (2009) point out that these are typically larger firms with higher bond rating, causing another bias in the calculation.

Following the representative bond approach, researchers select a representative bond for each firm. The literature shows different procedures picking a single bond: a random issue (e.g., Asquith and Wizman 1990), the most heavily (e.g., Campbell et al. 2015; Wei and Yermack 2011) or frequently (e.g., Handjinicolaou and Kalay 1984) traded bond, the most recently issued (e.g., Klein and Zur 2011), or the one with median time to maturity (e.g., Asquith and Wizman 1990). Bessembinder et al. (2009) yet indicate that depending on how the representative bond is selected the results could be biased. Nonetheless, choosing the most heavily or frequently traded bond could be justified with the inherent illiquidity of the bond market. It is crucial to ensure certain liquidity for bond event studies. Therefore, this approach should not be excluded overhastily.

The firm level approach is equivalent to the approach B (reducing data to independent observations), presented by Galbraith et al. (2010) to treat clustered data. The multiple observations in a cluster are reduced to a single observation and the resulting data points are regarded as independent. The firm level approach can be subdivided into an equally weighted and a value weighted approach. With the equally weighted approach a firm's abnormal return is calculated as the sum of the abnormal returns, divided by the quantity of issued bonds. Following the value weighted approach, a firm's abnormal return is calculated as the sum of the market-value weighted abnormal returns of *n* bonds.

$$FBR_{j,t} = \sum_{i=1}^n ABR_{i,t} \cdot w_{i,t} \quad (1)$$

where $FBR_{j,t}$ abnormal bond return of firm *j*, $ABR_{i,t}$ abnormal bond return of bond *i* issued by firm *j*, $w_{i,t}$ market value weight of bond *i*.

Since a firm's bond returns are highly but not perfectly correlated, this procedure causes downward shifted *t*-statistics due to inflated standard errors (Eberhart and Siddique 2002). Furthermore, only the value weighted approach represents the exact value change of the examined firm. Applying the equally weighted approach overestimates the price reaction of smaller bond issues and underestimates the price reaction of larger issues. On the other hand, Ederington et al. (2015) test four weighting schemes to combine standardized abnormal returns into a single firm return, among them the equally weighted average and the weighted approach from Bessembinder et al. (2009). Overall, results show only slight power differences between the four approaches.

3 Bond event study methodology

3.1 Market model

Traditionally, the market model is an example of a one-factor model which relates the return of any given security to the return of a market portfolio.⁵ While the market model provides an elaborated procedure to measure abnormal returns for stockholders finding its way into many event studies, its application to bond event studies contains several empirical issues. One issue is the potential non-stationarity of the beta coefficient. Elton et al. (2011) discuss the application of the single-index model to bonds and argue that the bond beta equals the ratio of the duration of the bond and the duration of the index. On this basis, the beta decreases with time and the decrease becomes steeper as the bond approaches maturity. Elton et al. (2011) mention further influences affecting returns on bonds including liquidity premiums, tax effects, callability, and default risk. They argue that the single-index model only provides appropriate results if the impact of all these influences were constant over time. Alexander (1980) provides further support for this conclusion. Conducting an analysis of the use of the market model to long-term corporate bonds, he infers that the market model involves notable violations of regression assumptions and instances of parameter instability. Therefore, the interpretation of bond event studies that apply the market model has to be made with extreme caution.

Nevertheless, several published event studies apply a standard (e.g., Dittmar 2004; Plunus et al. 2012) or two index market model⁶ (e.g., Kim and McConnell 1977; Marais et al. 1989; Wei and Yermack 2011). Two papers (e.i., Brewer and Jackson 2000; Dbouk and Kryzanowski 2009) follow the methodology recommended by Karafiath (1988) and add dummy variables for the event date to the right-hand side of the market model. For the two index market model the abnormal bond returns $ABR_{i,t}$ are calculated over the event period as follows.

$$ABR_{i,t} = BR_{i,t} - \hat{\alpha}_i - \hat{\beta}_{i1} \cdot S_t - \hat{\beta}_{i2} \cdot B_t \quad (2)$$

where $BR_{i,t}$ return of corporate bond i , $\hat{\alpha}_i$; $\hat{\beta}_{i1}$; $\hat{\beta}_{i2}$ coefficients calculated over the estimation period, S_t return of a stock market index, B_t return of a bond market index.

After the single-index model, Elton et al. (2011) discuss the relevance of multi-index models and assert that using more than a single-market-factor seems to improve the explanatory power. For instance, to capture changes in the term structure researchers apply the changes in the long rate and changes in the spread between long and short rate as regression factors. To deepen this approach multi-factor models are discussed in the next section.

3.2 Multi-factor models

The first and probably most famous factor model used to estimate abnormal returns for bondholders is the five-factor model, provided by Fama and French (1993). Based on the observation that β only provides little explanation about the cross-section of average stock

⁵ See MacKinlay (1997) for calculation details.

⁶ Bessembinder et al. (2009) name this method also factor model while according to Eger (1983) it belongs to the market model approach. This thesis follows the understanding of Eger (1983) and defines them as two-index market models.

returns (see Fama and French 1992), Fama and French decide to extend the set of variables used to explain both stock and bond returns in time-series regressions. The size and book-to-market variables directed at stocks are extended by term-structure variables that are likely to play a role in bond returns. Their goal is to test whether variables that explain bond returns are also important in stock returns, and vice versa.

$$BR_{i,t} - R_{f,t} = \alpha + \beta_1 \cdot (R_{m,t} - R_{f,t}) + \beta_2 \cdot SMB_t + \beta_3 \cdot HML_t + \beta_4 \cdot TERM_t + \beta_5 \cdot DEF_t + \varepsilon_{i,t} \quad (3)$$

where $BR_{i,t}$ return of corporate bond i , $R_{m,t}$ return of all the stocks in the created portfolios, $R_{f,t}$ one-month Treasury bill rate, observed at the beginning of the month, SMB_t (Small Minus Big) difference between the returns of small- and big- size portfolios with about the same weighted-average book-to- market equity, HML_t (High Minus Low) difference between the returns of high- and low- book-to-market portfolios with about the same weighted-average size, $TERM_t$ difference between the long-term government bond return and the one-month Treasury bill rate measured, observed at the beginning of the month, DEF_t difference between the return of a market portfolio of long-term corporate bonds and the long-term government bond return on day t .

Altogether, Fama and French (1993) not only identify three stock-market-factors, but also two bond-market-factors explaining bond returns. The excess market return ($R_{m,t} - R_{f,t}$) is the proxy for the market factor, while the size-variable SMB_t and the book-to-market equity-variable HML_t proxy for common risk factors in returns. The first bond-factor $TERM$ controls for unexpected shifts in interest rates, while the second factor DEF accounts for the likelihood of default. This five-factor model is applied to several studies (e.g., Bessembinder et al. 2009; DeFond and Zhang 2014). Bessembinder et al. (2009) test the Fama and French five-factor model to construct abnormal bond returns and find major problems. It consistently performs poorly, regardless of the used test statistics.

Better specified is the following factor model, at least with monthly data (Bessembinder et al. 2009). Utilizing fundamental economic variables as well as return indexes they develop different models successful in explaining expected bond returns. Based on the six-factor model by Elton et al. (1995) the following model is applied in bond event studies (e.g., Eberhart and Siddique 2002). The objective of this model is to successfully explain expected returns in bond markets applying methodology so far only used to explain relative prices for equity securities. To achieve this, return indexes as well as unanticipated changes in fundamental economic variables are utilized as factors in time-series regression. Additionally, this model is the first to employ forecasts provided by economists and investment professionals to account for unexpected changes in fundamental economic variables.

$$BR_{i,t} - R_{f,t} = \alpha + \beta_1 \cdot (UnxGDP_t) + \beta_2 \cdot (UnxCPI_t) + \beta_3 \cdot (DefaultRP_t) + \beta_4 \cdot (BondMktRet_t) + \beta_5 \cdot (R_{m,t}) + \beta_6 \cdot (TERM_t) + \varepsilon_{i,t} \quad (4)$$

where $BR_{i,t}$ return of corporate bond i , $R_{f,t}$ one-month Treasury bill return, $UnxGDP_t$ forecast of nominal GNP growth rates regressed on $Inflation_t$. Residuals with the sample mean added back as variable, $UnxCPI_t$ change in the consumer's forecast on inflation over the next year, $DefaultRP_t$ difference in return between the high-yield series and the intermediate government index, $BondMktRet_t$ return of the Lehman Brothers bond index, $R_{m,t}$ return of a market index (S&P 500), $TERM_t$ difference in return between the long-term government bond index and the intermediate bond index (slope of the term structure).

What sets this model apart is the utilization of two fundamental variables for unanticipated changes, i.e. a measure of unexpected changes in inflation and of unanticipated change in the forecast of real GNP. However, between this six-factor model and the one introduced by Elton et al. (1995) exists a noticeable difference. Considering seven explanatory variables, Elton et al. (1995) detect no influence by the variable measuring term spread. Therefore, they remove the $TERM_t$ variable from the regression. But an option index variable⁷ is included into the analysis, omitted by subsequent bond event studies (Bessembinder et al. 2009; Eberhart and Siddique 2002).

The third factor model is based on Collin-Dufresne et al. (2001).

$$\Delta CS_{i,t} = \alpha + \beta_1 \cdot R_{i,t} + \beta_2 \cdot \Delta r_t^{10} + \beta_3 \cdot (\Delta r_t^{10})^2 + \beta_4 \cdot \Delta slope_t + \beta_5 \cdot \Delta VIX_t + \beta_6 \cdot R_{m,t} + \beta_7 \cdot \Delta jump_t + \varepsilon_{i,t} \quad (5)$$

where Δ difference between two consecutive quotes, $CS_{i,t}$ difference between the yield of bond i and the associated yield of the Treasury curve at the same maturity, $R_{i,t}$ stock return for the issuer of bond i , r_t^{10} 10-year Benchmark Treasury rates, $slope_t$ difference between 10-year and 2-year Benchmark Treasury yields, VIX_t VIX index for volatility of the S&P 500, $R_{m,t}$ return of a stock market index (S&P 500), $jump_t$ probability and magnitude of a large negative jump in firm value as measured by changes in the slope of the “smirk” of implied volatilities of options on S&P 500 futures.

The difference between the Collin-Dufresne et al. (2001) model and the two previous mentioned factor models is the analysis of spread changes instead of spreads. Therefore, not abnormal returns but unexpected changes in spreads are calculated. The authors’ objective is to investigate how changes in credit spreads respond to proxies for changes in the likelihood of default and for changes in the recovery rate. Moreover, variables accounting for liquidity changes are considered too, as prior research shows that liquidity premiums explain credit spread changes.

However, this model is also used without calculating the difference between two consecutive quotes (e.g., Ongena et al. 2008). To the best of the authors’ knowledge, no investigation of the empirical power or specification of the Collin-Dufresne et al. (2001) has been conducted.

The latest factor model is provided by Ellul et al. (2011).⁸ Following methodologies used by Bessembinder et al. (2006) and Schultz (2001) to examine corporate bond trading costs, they measure abnormal bond returns controlling for both market-wide and issuer-specific information by applying the following factor model.

$$\ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right) = \alpha + \beta_1 \cdot (\Delta YTM_t^{10} \cdot T_i) + \beta_2 \cdot (\Delta InvCS_t \cdot T_i) + \beta_3 \cdot (\Delta highCS_t \cdot T_i) + \beta_4 \cdot \Delta R_{m,t} + \beta_5 \cdot \Delta R_{i,t} + \gamma_0 \cdot \Delta Q_{i,t} + \gamma_1 \cdot \Delta(Q_{i,t} \cdot \ln(S_{i,t})) + \varepsilon_{i,t} \quad (6)$$

where Δ difference between two consecutive quotes, $P_{i,t}$ trade price of bond i , YTM_t^{10} 10-year Treasury bond yield, T_i years to maturity of bond i , $InvCS_t$ credit spread of

⁷ *Option_t*: is the difference in return between the Lehman Brothers Government National Mortgage Association index and a government bond series with the same duration.

⁸ Ellul et al. (2011) call it a “simple market model”. However, since the regression contains more than just market returns, we list it under the section “factor models”.

investment-grade bonds, $highCS_t$ credit spread of high-yield bonds, $R_{m,t}$ return of a stock market index, $R_{i,t}$ stock return for the issuer of bond i , $Q_{i,t}$ indicator variable that equals one (minus one) if the transaction is a buy (sell), $S_{i,t}$ size of the trade (par value).

Like Bessembinder et al. (2006) they use an indicator variable to account for buyer- or seller-initiated trades. This variable and the associated factors in the model (coefficients γ_0 and γ_1) are included to control for the normal price impact of a bond trade. The other determinants (coefficients β_1 , β_2 , β_3 , β_4 , and β_5) are information variables that are supposed to affect the corporate bond's fundamental value.

Ellul et al. (2011) are the first to discuss an issue inherent in several factor models for bondholder wealth effects: equal coefficients for changes in stock market returns and/or changes in issuer returns for bonds of different rating categories, as well as no differentiation between bonds with varying maturities. They argue that bonds with lower ratings are more equity-like, and therefore load more on the change in the high-yield spread and stock market returns. Moreover, treating maturity adjustments the same way for all bonds would be inaccurate too, since the difference between modified duration and maturity grows with increasing maturity. Hence, they construct four different bond groups, classified by maturity at event-date (≤ 5 years or > 5 years) and pre-event rating (at BBB- or above BBB-), assuming that the parameters are the same for all bonds in one group. Subsequently, the estimation of abnormal bond returns is done separately for four groups.

3.3 Valuation prediction error

To determine the wealth effects of mergers on all of the publicly traded securities, including bonds, Maquieira et al. (1998) compute a valuation prediction error (VPE) for every security. Rather than the more common bond returns they assess excess changes in yield spreads. For each individual bond issue, a maturity and coupon rate matched outstanding government bond is allocated. Next, pre-event yield spreads are computed as the difference between the matched government bond's yield to maturity and the yield to maturity of the sample corporate bond.

$$Yield\ Spread_{i,t} = YTM_{i,t} - YTM_{Govt,i,t} \quad (7)$$

where $YTM_{i,t}$ Yield to maturity of the corporate bond i , $YTM_{Govt,i,t}$ Yield to maturity of the matched government bond i .

Next, it is assumed that the pre-event yield spread will remain unchanged over time. This assumption allows the computation of an expected yield to maturity for each bond, based on the observed value of its matching government bond during the post-event time. Knowing the expected yield to maturity, remaining maturity, and coupon rate, the expected post-event price of a bond can be computed using a standard internal rate of return bond price formula. The VPE for each bond is computed as the difference between the actual price and the expected price, after adjusting for bond redemptions, conversions, and sinking fund payments.

$$VPE_{i,t} = Price_{i,t} - Price_{expected,i} \quad (8)$$

where $Price_{i,t}$ actual price of corporate bond i , $Price_{expected,i}$ expected price of corporate bond i .

Nishikawa et al. (2011) employ the above described methodology, yet compute abnormal changes in bond yield spreads instead of valuation prediction errors. They search for the closest trade within a pre-event ($-t_1, -1$) and post-event ($0, t_2$) window relative to the

examined event, and calculate two corresponding yield spreads for each firm. The pre-event spread is assumed to be equal to the expected yield spread and the difference between the post-event and pre-event spread reflects the impact of the examined event on the credit risk component of the spread, equaling the abnormal change in bond yield spreads.

3.4 Mean adjusted model

Based on the mean adjusted returns model for stocks (Brown and Warner 1980, 1985). Handjinicolaou and Kalay (1984) create a simple bond event study model that accounts for a specific challenge dealing with fixed income securities: bond returns are influenced by changes in the term structure. Few studies apply the unadjusted formula (e.g., Dann 1981; Masulis 1980). However, changes in the term structure of interest rates must be considered to ensure that abnormal bond returns are not the result of risk free rate changes. The concept is to disentangle the influence of bond specific information from information that affects interest rates market-wide.

The adjusted calculation is divided into three steps. First, they calculate premium bond returns $PR_{i,t}$ over a previously determined estimation and event period, calculated as follows.

$$PR_{i,t} = BR_{i,t} - TR_{i,t} \quad (9)$$

where $BR_{i,t}$ return of corporate bond i , $TR_{i,t}$ return of matched Treasury security i .

Conventionally, the Treasury security is the one with the most similar time to maturity and coupon. Another matching category used to identify the adequate Treasury security is duration (e.g., Elliott et al. 2009; Kitsabunnarat-Chatjuthamard et al. 2010). Duration is supposed to be a more precise measure of the bond's sensitivity to interest rate changes (Kraft and Munk 2007).

Second, expected premium bond returns EPR_i are calculated as the average premium bond return over the estimation window.

$$EPR_i = \frac{1}{d} \cdot \left(\sum_{t=\tau_1}^{\tau_2} PR_{i,t} \right) \quad (10)$$

where $\tau_{1(2)}$ first (last) day of the estimation period, d number of days in the estimation period.

Third, abnormal premium bond returns $APR_{i,t}$ are calculated for each bond by subtracting the expected premium bond returns EPR_i from the actual premium bond returns $PR_{i,t}$ on event day t .

$$EPR_i = \frac{1}{d} \cdot \left(\sum_{t=\tau_1}^{\tau_2} PR_{i,t} \right) \quad (11)$$

$$APR_{i,t} = PR_{i,t} - EPR_i \quad (12)$$

The assumption inherent in this methodology is that premium bond returns follow a stationary process, leading to a constant return over the matched Treasury bond. However, this comparison of estimation and event date premium returns is unable to disentangle the effects of bond-specific information from market-wide movements in credit spreads,

making the mean adjusted model less convincing.⁹ Testing the mean adjusted model, Bessembinder et al. (2009) observe that the model performs well with monthly data but always with less statistical power than the portfolio matching methods. Nevertheless, papers still use this model despite its shortcomings (e.g., Tsai and Wu 2015).

3.5 Matching portfolio model

A more sophisticated method uses bond portfolios to remove the influence of the overall market on bond returns. In the matching portfolio model, abnormal bond returns are measured using a procedure that compares portfolios. Early studies mentioning this approach are Kim and McConnell (1977), Asquith and Kim (1982), and Eger (1983). The first two papers apply the paired-comparison procedure, a special form of the matched portfolio model. With the paired-comparison procedure just one bond issued by a non-sample company is matched with the bond issued by a sample-company on four observable characteristics. These are (1) bond rating, (2) term to maturity, (3) coupon interest rate, and (4) industry (Asquith and Kim 1982; Kim and McConnell 1977). Kim et al. (1977) provide the theoretical and empirical justification for matching the bonds on these characteristics.

To calculate the abnormal returns to bondholders, the rate of return on each matching bond is subtracted from the return on its corollary sample bond over the event period. Few papers use matched government bonds instead of corporate bonds to construct a measure of market interest rate movements (e.g., Fortin et al. 2014; Kahan and Tuckman 1993; Steiner and Heinke 2001; Strong and Meyer 1987). However, this procedure conflicts with the mean adjusted model, and therefore cannot be recommended for future research.¹⁰

Eger (1983) is the first to calculate abnormal bond returns by matching every sample bond with a portfolio of bonds. The control portfolio for each sample bond was selected from all publicly traded, non-convertible bonds in the same rating category and with the closest maturity. Thereby, the control samples vary in size from five to ten bonds. Subsequent papers apply this approach (e.g., Gao et al. 2011; May 2010) with equally- as well as value weighted portfolios. Bessembinder et al. (2009) use six rating and three time to maturity categories to create 17 portfolios¹¹ for monthly data, and six matching portfolios based on the rating categories for daily data, both equal- and value weighted. Their results show that the value weighted approach outperforms almost universally all other approaches.

Another alternative for a portfolio are bond indexes. An early study that utilized this approach is provided by Dennis and McConnell (1986). Although Dennis and McConnell (1986) mention the necessity of an appropriate risk adjusted market index, they do not explicate the appropriate measurements to ensure the risk adjustment. Their calculations seem to be similar to the simulations for stocks conducted by Brown and Warner (1985), neglecting the appropriate index matching. Later studies match their bond indexes by time to maturity alone (e.g., Asquith and Wizman 1990; Cook et al. 1992) or time to maturity and rating classification (e.g., Hite and Warga 1997; Warga and Welch 1993). Typically, the indexes are divided into different rating classes (e.g., Aaa, Aa, A, Baa, Ba, and B) and, within each ranking, into different term structures (e.g., long-term and intermediate term), providing several matching portfolios. While constructing abnormal bond returns and

⁹ Corrado (2011) provides the same explanation for stock returns.

¹⁰ "Stationarity is the central assumption of the mean adjusted returns model" (Handjinicolaou and Kalay 1984).

¹¹ The Aaa sample was too small to split into three subsets. Instead, only two maturity categories were used.

applying the Lehman Brothers indexes, Bessembinder et al. (2009) report that Lehman’s inclusion of bankruptcies induces a significantly positive bias, and therefore should not be used as a benchmark portfolio. Furthermore, it remains unclear if the matched portfolio approach benefits from additional classification categories, e.g., firm size and industrial classification. Examining the impact of controlling for industry upon financial research, Kahle and Walkling (1996) find that size- and industry-matched comparison are more powerful than pure size matches. On the other hand, Chen et al. (2014) control in their bond event study for additional characteristics including index beta, liquidity, outstanding par size, coupon, and industry and obtain similar results. They conclude that any selection bias in the control sample is negligible when matching on just rating and maturity. Future research might explore more carefully the impact of further matching categories.

Regardless of the portfolio, the abnormal bond returns $ABR_{i,t}$ are calculated over the event period as follows.

$$ABR_{i,t} = BR_{i,t} - PBR_{i,t} \tag{13}$$

where $BR_{i,t}$ return of corporate bond i , $PBR_{i,t}$ average return of matched bond portfolio i .

To conclude, Table 2 presents a summary of the advantages and disadvantages of the different models reviewed.

Table 2 Pros and cons of bond event study models

Model	Pros	Cons
Market Model	Widely-used with stock returns	Non-stationarity of the beta coefficient(s) Disregard of bond specific attributes like liquidity, callability, and default risk No differentiation regarding change in bond maturity and default risk
Multi-Factor Models	Higher explanatory power than standard market model through additional factors	Non-stationarity of the beta coefficient(s) No differentiation regarding change in bond maturity and default risk (except Ellul et al. 2011)
Valuation Prediction Error	Not two consecutive prices necessary to calculate returns Accounts for market-wide changes of the term structure	Assumption of a constant yield spread Unable to differentiate between the effects of bond-specific information and market-wide movements in yield spreads
Mean Adjusted Model	Accounts for market-wide changes of the term structure	Assumption of a constant return over a matched Treasury bond Unable to differentiate between the effects of bond-specific information and market-wide movements in credit spreads
Matching Portfolio Model	Controls for default risk and bond maturity Accounts for market-wide changes of the term structure Most powerful model to detect abnormal bond returns (see Bessembinder et al. 2009) Eliminates rating and maturity as sources for cross-correlation among abnormal bond returns (see Ederington et al. 2015)	Building of bond portfolios necessary

4 Test statistics

Various papers discuss the utilization of the proper test statistic with regard to the calculation of abnormal stock returns as well as possible adjustments to increase test power (e.g., Corrado 1989; Boehmer et al. 1991; Swenney 1991; Cowan 1992). Previous research on bond event studies, on the other hand, mostly utilizes standard test statistics like the non-parametric sign (e.g., Cook et al. 1992; Datta and Dhillon 1993; Maxwell and Stephens 2003) and Wilcoxon signed rank (e.g., Billett et al. 2004; Klein and Zur 2011; May 2010) as well as the parametric t-test (e.g., Crabbe 1991; Maquieira et al. 1998; Wei and Yermack 2011); (see Table 1). The parametric t-test is, however, less powerful than non-parametric sign and signed rank-tests (Bessembinder et al. 2009; Ederington et al. 2015) while the sign appears to be more powerful than the signed rank-test (Ederington et al. 2015). The underlying source of the decreased explanatory power of the parametric test is the disregard of heteroskedasticity in bond returns (Ederington et al. 2015). This is caused by different abnormal return volatilities between bond groups: abnormal return variance rises as the time to maturity lengthens and ratings deteriorate (Bessembinder et al. 2009; Ederington et al. 2015). Moreover, prices of infrequently traded bonds appear to be even more volatile during the financial crisis. According to Ederington et al. (2015), an attempt to resolve this issue is a standardization of each bond's return by its estimated standard deviation s_i in the spirit of Jaffe (1974), Mandelker (1974), and Patell (1976) yielding the standardized abnormal return. This approach is also discussed in Binder (1998).

First, Ederington et al. (2015) compute s_i by calculating the standard deviation around event date t using observed 2-day returns from $t - 55$ to $t + 55$ but excluding the 11 event day returns $t - 5$ to $t + 5$.¹² Second, standardized abnormal bond returns $SABR_{i,t}$ are calculated by dividing the abnormal bond return by its standard deviation.¹³

$$SABR_{i,t} = \frac{ABR_{i,t}}{s_i} \quad (14)$$

where $ABR_{i,t}$ abnormal return of bond i , s_i estimated standard deviation of abnormal returns of bond i , $SABR_{i,t}$ standardized abnormal return of bond i .

Another similar standardization procedure is applied by the construction of abnormal standardized bond returns $ASBR_{i,t}$. These are computed in a two step process: First, raw returns are divided by their standard deviation (see Eq. 15) and then the standardized average returns are subtracted from the matched bond portfolio (see Eq. 16).

$$SBR_{i,t} = \frac{BR_{i,t}}{s_i} \quad (15)$$

$$ASBR_{i,t} = SBR_{i,t} - SPBR_{i,t} \quad (16)$$

where $BR_{i,t}$ raw bond return of bond i , s_i estimated standard deviation of raw returns of bond i , $SBR_{i,t}$ standardized bond return of bond i , $SPBR_{i,t}$ standardized average return on matched bond portfolio i , $ASBR_{i,t}$ abnormal standardized return of bond i .

Standardized returns are subsequently used to calculate parametric and non-parametric test statistics. According to Ederington et al. (2015), both parametric and non-parametric

¹² See Ederington et al. (2015) for further details.

¹³ When calculated from market model residuals denominator is multiplied by

$\sqrt{1 + \frac{1}{T_i} + \frac{(R_{mE} - \bar{R}_m)^2}{\sum_{t=1}^{T_i} (R_{mt} - \bar{R}_m)^2}}$. See Patell (1976), Boehmer et al. (1991) and Corrado (2011) for further details.

test-statistics benefit from the standardization, while the improvement of the t-test is the most impressive. Ederington et al. (2015) conclude, that the past poor performance of t-tests in bond event studies can be redirected to the violation of the homoskedasticity assumption. Nonetheless, instead of the t-test the Wilcoxon signed rank-test becomes the most powerful test for standardized returns. The sign test shows only minor improvements. Furthermore, Ederington et al. (2015) observe that the discrepancies between the $SABR_{i,t}$ and $ASBR_{i,t}$ results are negligible, therefore, presenting only the results for the second return measure.

As Brown and Warner (1985) show for stock returns, Bessembinder et al. (2009) verify the predominance of daily bond return data compared to monthly data in event studies. However, both fail to clarify whether the power and specification of the tests could be further increased by incorporating trades over longer event windows. Ederington et al. (2015) argue that a lengthened event window may produce more powerful tests, due to a higher number of event days with calculable returns, less undesirable noise in individual bond trade prices, and a higher number of bonds for constructing firm returns. On the other hand, longer event windows could cause greater non-event-induced fluctuations in bond returns reducing test power. To provide an answer, Ederington et al. (2015) construct a composite standardized abnormal return while allocating increased weights to returns calculated from transactions closest to the examined event. It is constructed as the average return of all possible return calculations for a predetermined event window, starting at least one day before and ending at least one day after event day $[0;0]$.¹⁴ The weighing is completed automatically because volatility for shorter windows is normally lower than for longer windows. Overall, Ederington et al. (2015) find that tests based on composite returns are more powerful due to an increased number of calculable returns, and this power even increases with the window length,¹⁵ albeit at a decreasing rate. Moreover, an expansion of the event window beyond $(t - 3, t + 3)$ only results in slight increases of test power. This reduction in test power very likely results from events and information other than the event of interest which affect bond returns calculated while using longer event windows.

Finally, Ederington et al. (2015) test the adjustment for cross-sectionally correlated abnormal returns, developed by Kolari and Pynnönen (2010) and find that the bias is less severe for bonds compared to stocks. Apparently, the matching by rating and maturity procedure eliminates two of the major sources of correlation in bond returns. However, Ederington et al. (2015) also show that event studies with likely correlated bond returns and longer event windows clearly benefit from the adjustment. Hence, future research that suspects bond returns to be correlated (e.g., due to event day clustering) ought to control for a possible bias following Kolari and Pynnönen (2010).

Interestingly, researcher computing abnormal bond returns, to this point, have neglected the issue of skewed abnormal return distributions. As prior research points out (Brown and Warner 1980, 1985; Corrado 1989; Corrado and Zivney 1992), non-parametric test statistics provide a sensible addition to the parametric t-test in the case of possible non-normality, but still require a symmetrical distribution of security returns to be correctly specified. Otherwise, they too can lead to incorrect conclusion about the significance of certain events on security returns. To account for this problem with stock returns, Corrado (1989) developed (and Corrado and Zivney 1992 enhanced) an easy to compute non-

¹⁴ See Ederington et al. (2015) for examples.

¹⁵ Ederington et al. (2015) calculate abnormal standardized returns over the $(t - 2, t + 2)$, $(t - 3, t + 3)$, $(t - 4, t + 4)$, and $(t - 5, t + 5)$ window.

parametric test statistic which does not require a symmetrical distribution, commonly known as the Corrado-test. This test statistic, which is widely used with stock event studies, can also easily be applied to bond event studies. Surprisingly, to the best of the authors' knowledge only a single paper by Steiner and Heinke (2001) utilizes it to analyze the significance of abnormal bond returns. Future research ought to consider testing the advantages of the Corrado-test for bond event studies and provide statistical information about the average skewness of excess bond returns and its impact on the validity of bond event studies. As a result, the Corrado-test might replace the signed-rank test as the most powerful for standardized returns, which, in turn, could have an impact on bond event study research altogether.

5 Data and data sources

To examine the impact of various events on bondholder returns, researchers screened different databases for availability of bond return data and issuer characteristic data. The quality and availability of the data to a great degree increased over time. Early empirical bond studies utilize daily exchange-based data provided by the Wall Street Journal (WSJ) or monthly data provided by the Moody's Bond Record, the S&P's Bond Guide, and the Bank and Quotation Record (BQR) (see Table 1). Exchange quotes are defined as prices that represent the trading conditions on organized exchanges (Nunn et al. 1986). However, the application of exchange prices is connected with major drawbacks. First, exchange trades reflect primarily the odd-lot activities of individual investors accounting only for a negligible portion of the total trading in listed corporate issues, as the vast majority of listed bond trading occurs over the counter (OTC) between institutional investors (Nunn et al. 1986). Second, exchange based data relies heavily on prices determined by using an algorithm on bond characteristics, known as matrix prices¹⁶ (Warga and Welch 1993). Hence, exchange prices may not accurately represent bond values. Third, exchange based data leads to lagged response and to weaker statistically and economically significance, as shown by Warga and Welch (1993). Furthermore, the data has to be hand-collected what frequently leads to rather small sample sizes. Thus overall, bond event study results obtained from exchange prices may be suboptimal and could be misleading. Therefore, the need for databases that provide institutional prices from major OTC bond dealers is predominant.

Since the 1990s, yet before the implementation of TRACE, many studies relied on the Lehman Brothers Bond Database (LBBD), also known as the Lehman Brothers Fixed Income Database (FIDB),¹⁷ to calculate abnormal bond returns (see Table 1). LBBD provides month-end price information over the period from January 1973 to March 1998 based on bid quotes from its dealers for publicly traded corporate bonds, as well as bond-specific diagnostics and descriptive information, such as S&P's and Moody's credit ratings, bond yields, coupons, accrued interests, and callability (Elton et al. 2001; Hong and Warga 2000; Kitsabunnarat-Chatjuthamard et al. 2010). According to Hite and Warga (1997) only bonds with a principal value of at least \$1 million, an investment grade at some point in their life, or an non-investment grade but traded by Lehman Brothers are included. The advantage of the Lehman bond data is the data-availability which enables increased

¹⁶ Matrix prices are discussed later in greater detail with the Lehman Brother Bond Database.

¹⁷ Data from the Lehman Brothers Fixed Income Database was distributed by Warga (1998) (e.g., Elton et al. 2001).

sample sizes, and provides trader quoted prices which are found to offer more robust results than exchange based data (Warga and Welch 1993). A disadvantage of this database, however, is that solely monthly data is provided which is found to cause decreased power and specification of the test statistics (Bessembinder et al. 2009). Besides, this database incorporates a bias towards large companies (Hite and Warga 1997) and contains matrix prices (Hong and Warga 2000). Matrix prices are not actual trader quotes but algorithmically determined prices. Whenever dealers do not supply a bond price, prices are determined by rules of thumb that specify the addition of a fixed spread over either an actively traded benchmark issue of the same company, another company's issue with similar rating, maturity, and coupon, or a Treasury bond (Warga and Welch 1993). Thus, matrix prices do not always incorporate all publicly available information.

Warga and Welch (1993) discuss the use of matrix pricing in event studies and find significant differences between trader-quoted and matrix-based prices, showing an undeniable weakness inherent in matrix prices. Quotes generated by matrix pricing may bias event month abnormal returns towards zero and cause event month and non-event month abnormal return to be equal (Easterwood 1998). Therefore, most studies that rely on Lehman data eliminate matrix priced bonds from their sample (e.g., Bessembinder et al. 2009; Elton et al. 2001; Penas and Unal 2004). Despite these drawbacks, many researchers nonetheless obtain bond data from the Lehman database because it provides information for a diverse variety of bonds without the need to hand collect them.

Insurance companies are required to provide a record of all bond transactions via a Schedule D to the National Association of Insurance Commissioners (NAIC) every quarter (Hong and Warga 2000). This schedule provides detailed transaction information, including trade date, total market value, par value of the bonds, as well as buyers' and sellers' identity and are available electronically since 1995 (Hong and Warga 2000; Schultz 2001). The major disadvantage of this database is the limitation to insurance companies, which might not trade as actively as other market participants (Bessembinder et al. 2006). However, Schultz (2001) along with Campbell and Taksler (2003) estimate that insurance companies hold between 33 and 40 % of all outstanding corporate bonds, thus represent a considerable portion of the corporate bond market. Therefore, it was also applied in bond event studies (e.g., Ellul et al. 2011) and is still used even after the introduction of TRACE (e.g., Douglas et al. 2014).

In July 2002, the National Association of Security Dealers (NASD predecessor of FINRA) introduced the Trade Reporting and Compliance Engine (TRACE) in an effort to increase the transparency of the US corporate debt market, which facilitates the mandatory reporting of OTC secondary market transactions in publicly traded eligible securities (investment grade, high yield, and convertible corporate debt) (FINRA 2012). All members are required to report bond identification (CUSIP or NASD/FINRA symbol), time and date of execution, price, yield, size and a sell or buy indication for each trade. However, only the first five are disseminated to the public (Bessembinder et al. 2006). Trade size is provided for investment-grade bonds with a face value of at least \$5 million, and for speculative-grade bonds with a face value of at least \$1 million. Otherwise, an indicator variable denotes a trade exceeding the aforementioned size (Bessembinder and Maxwell 2008).

Due to intraday data, prices can be used to construct return data at a daily or even finer frequency what allows the construction of trade-weighted prices. This is accomplished by weighting each trade on a given day by its size and computing volume-weighted average prices. Bessembinder et al. (2009) argue that this approach emphasizes the institutional trades that incur lower execution costs and find that statistical tests estimated with this

method are better specified and more powerful than those computed with end-of-day prices. Constructing daily returns by relying on the last trade of the day could introduce noise because prices reported in TRACE include bid-ask fees, which are negatively related to trade size and considerably large for small trades (May 2010). The trade-weighted price approach mitigates this issue by allocating more weight to large trades that are assumed to have lower trading costs. Utilization of the square root of trade size produces only slightly more powerful test statistics (Ederington et al. 2015).

Moreover, eliminating non-institutional trades by using only trades of \$100,000 or more lowers the standard deviation of abnormal returns even further, increasing the power of the test statistic (Bessembinder et al. 2009). In this way, the impact of transaction costs on return volatility is mitigated (Chen et al. 2011). However, this approach has the disadvantage of losing daily observations for bonds that only trade of less than \$100,000. Therefore, Ederington et al. (2015) investigate whether the positive effect of restricting the sample to trades of 100 or more bonds¹⁸ or the negative effect of the sample size reduction is the predominating effect. Restricting the sample to trades of at least 100 bonds produces small differences when compared to all trades (Ederington et al. 2015). The t-test is slightly more powerful, the sign test slightly less powerful, and the Wilcoxon signed rank-test shows mixed results. Thus, altogether there is no conclusive evidence of an improvement. Furthermore, restricting the sample to interdealer dates causes less noisy returns due to smaller bid-ask spreads and better informed market participants, hence, reduces the power of all test statistics.

Access to the information is either provided by the NASD website or investors rely on third-party vendors. Since its initiation in 2002, TRACE was expanded successively and by January 9, 2006, trades for nearly all publicly issued bonds were disseminated to the public (Bessembinder and Maxwell 2008). Omitted, however, are only those trades that occurred on exchanges, like the NYSE's Automated Bond System. But these represent only a minor part of all trades (Edwards et al. 2007). Disadvantages of TRACE are data availability (only since 2002, and full coverage since mid-2005) and that price information reflected in TRACE are prices without accrued interest ("clean prices"). While the first disadvantage will resolve over time, most papers rely on the Mergent Fixed Income Security Database (FISD) to supplement the TRACE data with accrued interests.¹⁹ Mergent FISD provides issue details on US debt securities, including credit rating, time to maturity, callability, coupon rates, and coupon frequency (Massa and Zhang 2011).

Regarding the decision to utilize "dirty" or "clean" prices to calculate bond returns, Bessembinder et al. (2009) point out that using "clean" prices could bias the results for bonds with significantly different accrued interests. However their and the results by Ederington et al. (2015) only show small difference in power if accrued interest is included or not. Therefore, accrued interest does not seem to be a requirement to conduct a bond event study.

Studies validating the implementation of TRACE conclude that investors benefit from the increased transparency through reduced transaction costs (Bessembinder et al. 2006; Bessembinder and Maxwell 2008; Edwards et al. 2007).

Further sources for daily pricing quotes are the Reuters Fixed Income Database and Thomson Financials Datastream. Reuters provides end-of-day pricing quotes based upon market quotes. According to Wei and Yermack (2011), Reuters gathers daily closing price

¹⁸ Trades of \$100,000 par value equal 100 bonds with \$1000 par value.

¹⁹ For instance, May (2010) calculates accrued interests relying on the raw return for a day on which the bond did not trade.

quotes for corporate bonds throughout each trading day, even if no trading took place. Then, Reuters releases provisional prices and allows clients to submit evidence to dispute Reuters' pricing. Whenever the dispute is justified, the data vendor initiates corresponding adjustments. Validating the accuracy of the Reuters bond data, Wei and Yermack (2011) obtain R^2 statistics from several regressions of close to 100 % and therefore conclude that TRACE and Reuters contain similar information. Since all Reuters prices are dealer quotes, they can contain matrix prices (Renneboog and Szilagyi 2007) causing the same shortcoming as with the Lehman data.

Datastream also uses quotes from dealers, but in contrast to Reuters does not calculate matrix prices if no new quotes are available. In the absence of dealer quotes, ex-coupon bond prices remain unchanged in Datastream (DeFond and Zhang 2008, DeFond et al. 2011). To calculate bond prices the price across all market makers for the bond is averaged (Chen et al. 2007). A potential advantage of Datastream relative to TRACE is that Datastream's full coverage begins in 1994²⁰ while TRACE has only limited coverage prior to 2006 (DeFond and Zhang 2008). According to Chen et al. (2007), Merrill Lynch²¹ is Datastream's source for price data, which covers most rated US publicly issued corporate bonds (Acharya et al. 2013).

6 Summary and conclusion

The purpose of this review is to fill a gap in the existing literature and provide a comprehensive overview of the applied methodology in bond event studies. First, those bond characteristics that affect event study results are summarized and the adjustments developed by researchers discussed. The low liquidity of bonds as well as the fact that several firms issue more than one bond are characteristics that differentiate bonds from stocks. Second, the favored models to calculate abnormal bond returns are illustrated and the applied parametric and non-parametric test statistics are discussed. One conclusion of past studies is that the matched portfolio approach using value weighted portfolios works well in event studies utilizing bond returns. With raw returns, non-parametric tests are more powerful than parametric t-tests. However, standardization of bond returns leads to a considerable increase in the power of the t-test. Nevertheless, a test of the statistical power of the non-parametric Corrado-test is, to the best of the authors' knowledge, not available. Third, the change in the availability of corporate bond data in the last four decades as well as the impact of improved databases on event study methodology are discussed. The introduction of the Lehman Brothers Bond Database in the 1990s providing monthly data, as well as the TRACE data set in 2002 providing daily data had a great influence on the occurrence of event studies concerning bondholder wealth effects.

While a variety of important issues concerning event studies examining the impact of corporate events on bondholder wealth have been pointed out by previous studies, researchers have developed a number of simple adjustments to ultimately obtain robust results. This challenge and the introduction of new databases lead to a noticeable evolution of bond event study methodology over time. Today, researchers can utilize assessed methods and test statistics with strong empirical power to detect abnormal bond returns.

²⁰ Chen et al. (2007) argue that daily prices are more regularly available through Datastream after 1995.

²¹ Since 2009 Bank of America Merrill Lynch.

This methodology review offers some guidance for researchers in choice of event study method. However, the methodology will continue to be a popular area of investigation and innovation with the attempt to enhance the validity of bond event studies.

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EXHIBIT 46

ICE Data Indices - Rules & Methodology

ICE BofA Single-A US Corporate Index (C0A3)

ICE BofA Single-A US Corporate Index is a subset of ICE BofA US Corporate Index including all securities rated A1 through A3, inclusive.

Inception date: December 16, 1988

ICE BofA US Corporate Index (C0A0)

ICE BofA US Corporate Index tracks the performance of US dollar denominated investment grade corporate debt publicly issued in the US domestic market. Qualifying securities must have an investment grade rating (based on an average of Moody's, S&P and Fitch), at least 18 months to final maturity at the time of issuance, at least one year remaining term to final maturity as of the rebalancing date, a fixed coupon schedule and a minimum amount outstanding of \$250 million. Original issue zero coupon bonds, 144a securities (with and without registration rights), and pay-in-kind securities (including toggle notes) are included in the index. Callable perpetual securities are included provided they are at least one year from the first call date. Fixed-to-floating rate securities are included provided they are callable within the fixed rate period and are at least one year from the last call prior to the date the bond transitions from a fixed to a floating rate security. Contingent capital securities ("cocos") are excluded, but capital securities where conversion can be mandated by a regulatory authority, but which have no specified trigger, are included. Other hybrid capital securities, such as those issues that potentially convert into preference shares, those with both cumulative and non-cumulative coupon deferral provisions, and those with alternative coupon satisfaction mechanisms, are also included in the index. Equity-linked securities, securities in legal default, hybrid securitized corporates, eurodollar bonds (USD securities not issued in the US domestic market), taxable and tax-exempt US municipal securities and \$1000 par preferred and DRD-eligible securities are excluded from the index.

Index constituents are market capitalization weighted. Accrued interest is calculated assuming next-day settlement. Cash flows from bond payments that are received during the month are retained in the index until the end of the month and then are removed as part of the rebalancing. Cash does not earn any reinvestment income while it is held in the index. Information concerning constituent bond prices, timing and conventions and index governance and administration is provided in the ICE BofA Bond Index Methodologies, which can be accessed on our public website (<https://indices.theice.com>), or by sending a request to iceindices@theice.com. The index is rebalanced on the last calendar day of the month, based on information available up to and including the third business day before the last business day of the month. New issues must settle on or before the calendar month end rebalancing date in order to qualify for the coming month. No changes are made to constituent holdings other than on month end rebalancing dates.

Inception date: December 31, 1972

The above rules take into account all revisions up to and including September 30, 2020



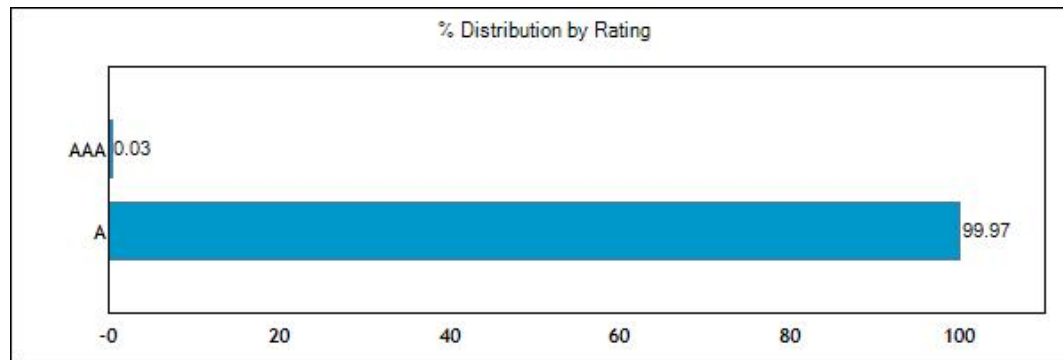
ICE Data Indices - Rules & Methodology

October 9, 2020

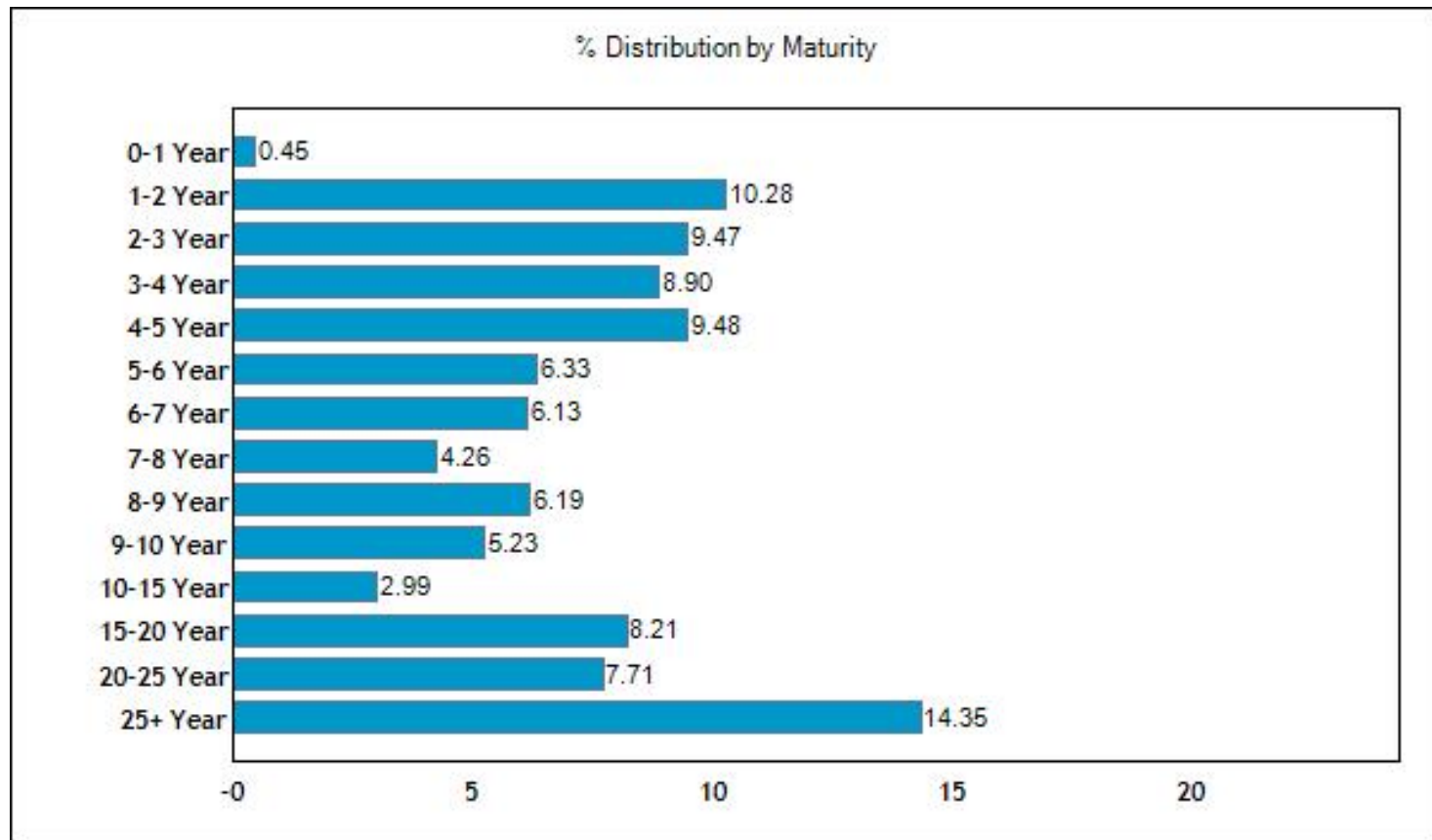
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Index distribution by Rating	# Bonds	FullVal	%Full Val	Eff Dur	Contr EffDur	Eff Yld	OAS	TRR%MTD	ExRtn%MTD
AAA		931.193	0.02857	0.00	0.00	-0.01	0		
A	3,430	3,258,536.385	99.97143	8.02	8.02	1.95	73	0.880	0.209
Grand Total	3,430	3,259,467.578	100.00000	8.02	8.02	1.95	73	0.880	0.209

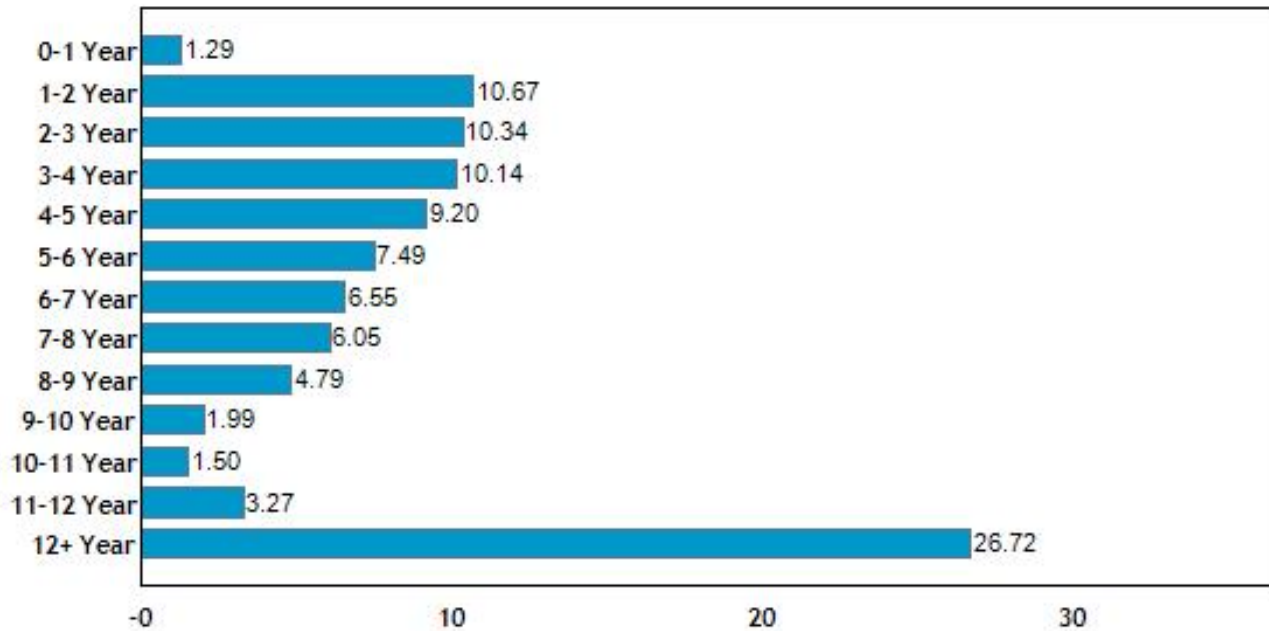


Index distribution by Maturity	# Bonds	FullVal	%Full Val	Eff Dur	Contr EffDur	Eff Yld	OAS	TRR%MTD	ExRtn%MTD
0-1 Year	17	14,762.365	0.45291	0.64	0.00	0.32	26		
1-2 Year	352	335,150.421	10.28237	1.42	0.15	0.45	37	0.067	0.062
2-3 Year	320	308,740.909	9.47213	2.36	0.22	0.62	38	0.126	0.066
3-4 Year	280	290,069.071	8.89928	3.29	0.29	0.97	49	0.256	0.098
4-5 Year	290	309,075.186	9.48238	4.20	0.40	1.32	60	0.464	0.168
5-6 Year	193	206,452.605	6.33394	5.01	0.32	1.56	60	0.505	0.084
6-7 Year	192	199,912.434	6.13328	5.85	0.36	1.88	72	0.591	0.081
7-8 Year	130	138,837.935	4.25953	6.51	0.28	2.16	86	0.754	0.166
8-9 Year	172	201,901.961	6.19432	7.55	0.47	2.30	84	0.819	0.112
9-10 Year	186	170,459.850	5.22968	8.49	0.44	2.37	78	0.907	0.094
10-15 Year	136	97,382.742	2.98769	9.74	0.29	2.75	98	1.106	0.183
15-20 Year	278	267,672.233	8.21215	12.46	1.02	3.11	110	1.421	0.286
20-25 Year	344	251,259.780	7.70861	15.12	1.17	3.26	107	1.881	0.540
25+ Year	540	467,790.085	14.35173	18.20	2.61	3.28	101	2.101	0.502
Grand Total	3,430	3,259,467.578	100.00000	8.02	8.02	1.95	73	0.880	0.209



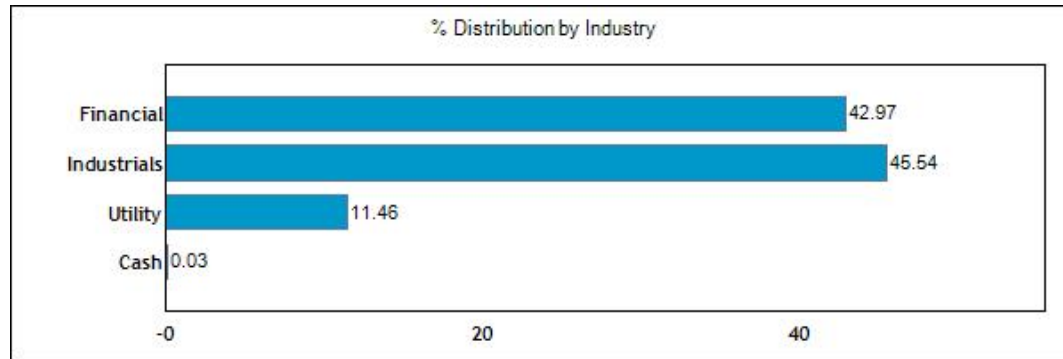
Index distribution by Duration	# Bonds	FullVal	%Full Val	Eff Dur	Contr EffDur	Eff Yld	OAS	TRR%MTD	ExRtn%MTD
0-1 Year	45	42,053.845	1.29021	0.79	0.01	0.38	30	0.058	0.066
1-2 Year	368	347,817.385	10.67099	1.51	0.16	0.47	38	0.071	0.063
2-3 Year	339	337,078.683	10.34153	2.52	0.26	0.67	39	0.144	0.068
3-4 Year	315	330,458.546	10.13842	3.56	0.36	1.10	54	0.342	0.144
4-5 Year	273	299,892.797	9.20067	4.51	0.42	1.42	61	0.473	0.120
5-6 Year	244	244,187.860	7.49165	5.49	0.41	1.71	64	0.548	0.073
6-7 Year	203	213,610.461	6.55354	6.43	0.42	2.13	85	0.724	0.146
7-8 Year	178	197,218.456	6.05063	7.56	0.46	2.31	84	0.845	0.135
8-9 Year	168	155,977.536	4.78537	8.44	0.40	2.40	82	0.916	0.100
9-10 Year	83	64,798.351	1.98800	9.29	0.18	2.46	77	1.031	0.124
10-11 Year	75	48,954.202	1.50191	10.60	0.16	3.02	114	1.247	0.250
11-12 Year	114	106,449.102	3.26584	11.44	0.37	3.07	112	1.339	0.281
12+ Year	1,025	870,970.355	26.72125	16.47	4.40	3.24	103	1.934	0.474
Grand Total	3,430	3,259,467.578	100.00000	8.02	8.02	1.95	73	0.880	0.209

% Distribution by Duration



Index distribution by Industry	# Bonds	FullVal	%Full Val	Eff Dur	Contr EffDur	Eff Yld	OAS	TRR%MTD	ExRtn%MTD
Banking	575	875,899.039	26.87246	5.48	1.47	1.54	68	0.537	0.110
Brokerage	115	224,819.417	6.89743	5.63	0.39	1.57	71	0.602	0.155
Cons/Comm/Lease Financing	48	37,619.380	1.15416	4.48	0.05	1.33	61	0.473	0.151
Investments & Misc Financial Services	126	90,051.462	2.76277	7.11	0.20	1.74	64	0.791	0.207
Financial Services (Sub Total)	289	352,490.258	10.81435	5.89	0.64	1.59	68	0.636	0.168
Insurance Brokerage	13	10,058.025	0.30858	9.06	0.03	2.07	70	1.168	0.402
Life Insurance	161	115,020.237	3.52880	8.38	0.30	2.30	97	0.861	0.155
P&C	59	41,674.316	1.27856	10.41	0.13	2.58	95	1.367	0.459
Reinsurance	11	5,308.828	0.16287	6.66	0.01	2.30	111	0.573	-0.003
Insurance (Sub Total)	244	172,061.406	5.27882	8.86	0.47	2.35	95	0.992	0.238
Financial (Total)	1,108	1,400,450.704	42.96563	6.00	2.58	1.65	71	0.618	0.141
Auto Loans	62	44,245.156	1.35744	3.22	0.04	0.81	35	0.255	0.070
Auto Parts & Equipment	5	3,375.900	0.10357	4.68	0.00	1.49	66	0.399	0.044
Automakers	24	20,048.467	0.61508	3.95	0.02	1.17	51	0.345	0.069
Automotive (Sub Total)	91	67,669.524	2.07609	3.51	0.07	0.95	41	0.289	0.069
Building & Construction	1	1,128.629	0.03463	6.91	0.00	2.21	79	1.490	0.855
Chemicals	43	26,878.991	0.82464	7.78	0.06	1.86	64	0.713	0.055
Forestry/Paper	11	8,724.689	0.26767	4.79	0.01	1.52	66	0.484	0.114
Metals/Mining Excluding Steel	29	29,403.558	0.90210	11.35	0.10	2.77	104	1.172	0.172
Basic Industry (Sub Total)	84	66,135.868	2.02904	8.96	0.18	2.22	82	0.899	0.128
Aerospace/Defense	35	30,367.509	0.93167	9.35	0.09	1.99	62	1.026	0.236
Diversified Capital Goods	82	73,650.444	2.25959	7.57	0.17	1.73	58	0.739	0.108
Machinery	94	63,951.476	1.96202	7.19	0.14	1.49	45	0.727	0.148
Capital Goods (Sub Total)	211	167,969.429	5.15328	7.75	0.40	1.69	54	0.786	0.146
Beverage	80	75,811.911	2.32590	9.62	0.22	1.94	53	1.140	0.310
Food - Wholesale	51	32,205.039	0.98805	9.40	0.09	2.00	56	1.073	0.250
Personal & Household Products	54	37,821.805	1.16037	7.49	0.09	1.77	57	0.880	0.249
Tobacco	25	20,980.987	0.64369	7.77	0.05	1.95	73	0.846	0.199
Consumer Goods (Sub Total)	210	166,819.741	5.11801	8.86	0.45	1.91	57	1.031	0.270
Energy - Exploration & Production	33	31,961.583	0.98058	8.91	0.09	2.68	109	1.050	0.261
Gas Distribution	28	16,103.428	0.49405	10.17	0.05	2.71	109	1.295	0.403
Integrated Energy	120	136,827.688	4.19785	8.16	0.34	2.13	94	0.750	0.078
Oil Field Equipment & Services	16	16,690.977	0.51208	6.34	0.03	1.90	84	0.760	0.241
Energy (Sub Total)	197	201,583.676	6.18456	8.29	0.51	2.25	97	0.842	0.147
Health Facilities	58	24,428.815	0.74947	14.64	0.11	3.05	104	1.420	0.129
Health Services	1	1,004.489	0.03082	8.82	0.00	2.64	99	0.821	-0.048
Managed Care	45	45,104.075	1.38379	11.09	0.15	2.29	69	1.027	0.062
Medical Products	24	26,690.592	0.81886	10.46	0.09	2.29	65	1.078	0.156
Pharmaceuticals	107	132,450.852	4.06357	9.39	0.38	1.98	58	0.884	0.079
Healthcare (Sub Total)	235	229,678.823	7.04651	10.41	0.73	2.19	66	0.991	0.090
Recreation & Travel	7	6,540.411	0.20066	3.77	0.01	1.24	51	0.379	0.059
Leisure (Sub Total)	7	6,540.411	0.20066	3.77	0.01	1.24	51	0.379	0.059
Advertising	24	25,420.072	0.77988	6.99	0.05	2.18	106	0.621	0.039
Cable & Satellite TV	60	94,548.942	2.90075	11.05	0.32	2.41	77	1.043	0.073
Media - Diversified	42	46,521.293	1.42727	10.65	0.15	2.32	74	0.995	0.064
Media Content	2	764.047	0.02344	6.95	0.00	2.39	112	0.493	-0.143
Media (Sub Total)	128	167,254.355	5.13134	10.30	0.53	2.35	81	0.963	0.064
RealEstate Dev & Mgt	5	2,640.370	0.08101	5.60	0.00	2.10	99	0.483	0.000
REITs	95	54,623.137	1.67583	7.54	0.13	2.02	79	0.915	0.272
Real Estate (Sub Total)	100	57,263.508	1.75684	7.45	0.13	2.03	80	0.895	0.259
Discount Stores	16	12,768.738	0.39174	8.42	0.03	1.89	53	1.211	0.488
Food & Drug Retailers	7	9,125.669	0.27997	7.36	0.02	1.77	68	0.676	0.064
Specialty Retail	77	104,801.321	3.21529	10.90	0.35	2.20	63	1.162	0.216
Retail (Sub Total)	100	126,695.727	3.88701	10.40	0.40	2.14	63	1.132	0.232
Support-Services	17	9,108.941	0.27946	13.32	0.04	2.58	81	1.887	0.743
Services (Sub Total)	17	9,108.941	0.27946	13.32	0.04	2.58	81	1.887	0.743
Electronics	71	78,458.164	2.40709	10.18	0.24	2.11	63	1.043	0.166
Software/Services	36	46,571.423	1.42880	7.10	0.10	1.65	55	0.825	0.240
Tech Hardware & Equipment	9	11,544.043	0.35417	7.99	0.03	1.76	48	0.768	0.093
Technology & Electronics (Sub Total)	116	136,573.630	4.19006	8.94	0.37	1.92	59	0.945	0.185
Telecom - Wireless	10	12,311.670	0.37772	9.86	0.04	2.63	106	1.156	0.288
Telecom - Wireline Integrated & Services	15	15,241.693	0.46761	5.05	0.02	1.52	65	0.347	-0.055
Telecommunications (Sub Total)	25	27,553.363	0.84533	7.20	0.06	2.02	83	0.707	0.098
Rail	53	32,827.771	1.00715	12.01	0.12	2.56	84	1.193	0.152
Transport Infrastructure/Services	4	2,744.416	0.08420	14.95	0.01	3.59	149	0.339	-0.995
Trucking & Delivery	21	17,971.371	0.55136	9.98	0.06	2.14	66	1.301	0.447

Transportation (Sub Total)	78	53,543.558	1.64271	11.48	0.19	2.47	81	1.185	0.192
Industrials (Total)	1,599	1,484,390.554	45.54089	8.97	4.09	2.04	69	0.921	0.157
Electric-Distr/Trans	114	59,248.969	1.81775	10.84	0.20	2.40	84	1.546	0.616
Electric-Generation	9	5,127.464	0.15731	6.59	0.01	2.49	132	0.595	0.026
Electric-Integrated	566	289,386.147	8.87833	12.22	1.08	2.77	98	1.776	0.705
Non-Electric Utilities	34	19,932.547	0.61153	10.79	0.07	2.46	87	1.527	0.591
Utility (Total)	723	373,695.127	11.46491	11.85	1.36	2.69	96	1.710	0.675
Corporate (Total)	3,430	3,258,536.385	99.97143	8.02	8.02	1.95	73	0.880	0.209
Cash		931.193	0.02857	0.00	0.00	-0.01	0		
Grand Total	3,430	3,259,467.578	100.00000	8.02	8.02	1.95	73	0.880	0.209



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ICE Data Indices - Rules & Methodology

ICE BofA BBB US Corporate Index (C0A4)

ICE BofA BBB US Corporate Index is a subset of ICE BofA US Corporate Index including all securities rated BBB1 through BBB3, inclusive.

Inception date: December 16, 1988

ICE BofA US Corporate Index (C0A0)

ICE BofA US Corporate Index tracks the performance of US dollar denominated investment grade corporate debt publicly issued in the US domestic market. Qualifying securities must have an investment grade rating (based on an average of Moody's, S&P and Fitch), at least 18 months to final maturity at the time of issuance, at least one year remaining term to final maturity as of the rebalancing date, a fixed coupon schedule and a minimum amount outstanding of \$250 million. Original issue zero coupon bonds, 144a securities (with and without registration rights), and pay-in-kind securities (including toggle notes) are included in the index. Callable perpetual securities are included provided they are at least one year from the first call date. Fixed-to-floating rate securities are included provided they are callable within the fixed rate period and are at least one year from the last call prior to the date the bond transitions from a fixed to a floating rate security. Contingent capital securities ("cocos") are excluded, but capital securities where conversion can be mandated by a regulatory authority, but which have no specified trigger, are included. Other hybrid capital securities, such as those issues that potentially convert into preference shares, those with both cumulative and non-cumulative coupon deferral provisions, and those with alternative coupon satisfaction mechanisms, are also included in the index. Equity-linked securities, securities in legal default, hybrid securitized corporates, eurodollar bonds (USD securities not issued in the US domestic market), taxable and tax-exempt US municipal securities and \$1000 par preferred and DRD-eligible securities are excluded from the index.

Index constituents are market capitalization weighted. Accrued interest is calculated assuming next-day settlement. Cash flows from bond payments that are received during the month are retained in the index until the end of the month and then are removed as part of the rebalancing. Cash does not earn any reinvestment income while it is held in the index. Information concerning constituent bond prices, timing and conventions and index governance and administration is provided in the ICE BofA Bond Index Methodologies, which can be accessed on our public website (<https://indices.theice.com>), or by sending a request to iceindices@theice.com. The index is rebalanced on the last calendar day of the month, based on information available up to and including the third business day before the last business day of the month. New issues must settle on or before the calendar month end rebalancing date in order to qualify for the coming month. No changes are made to constituent holdings other than on month end rebalancing dates.

Inception date: December 31, 1972

The above rules take into account all revisions up to and including September 30, 2020



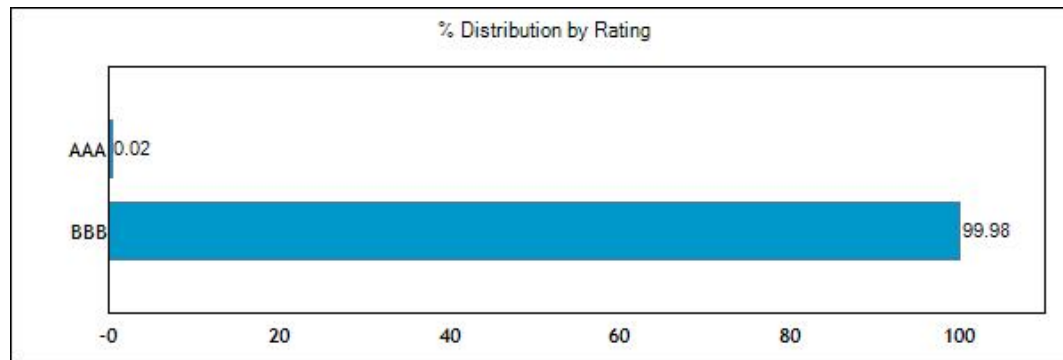
ICE Data Indices - Rules & Methodology

October 9, 2020

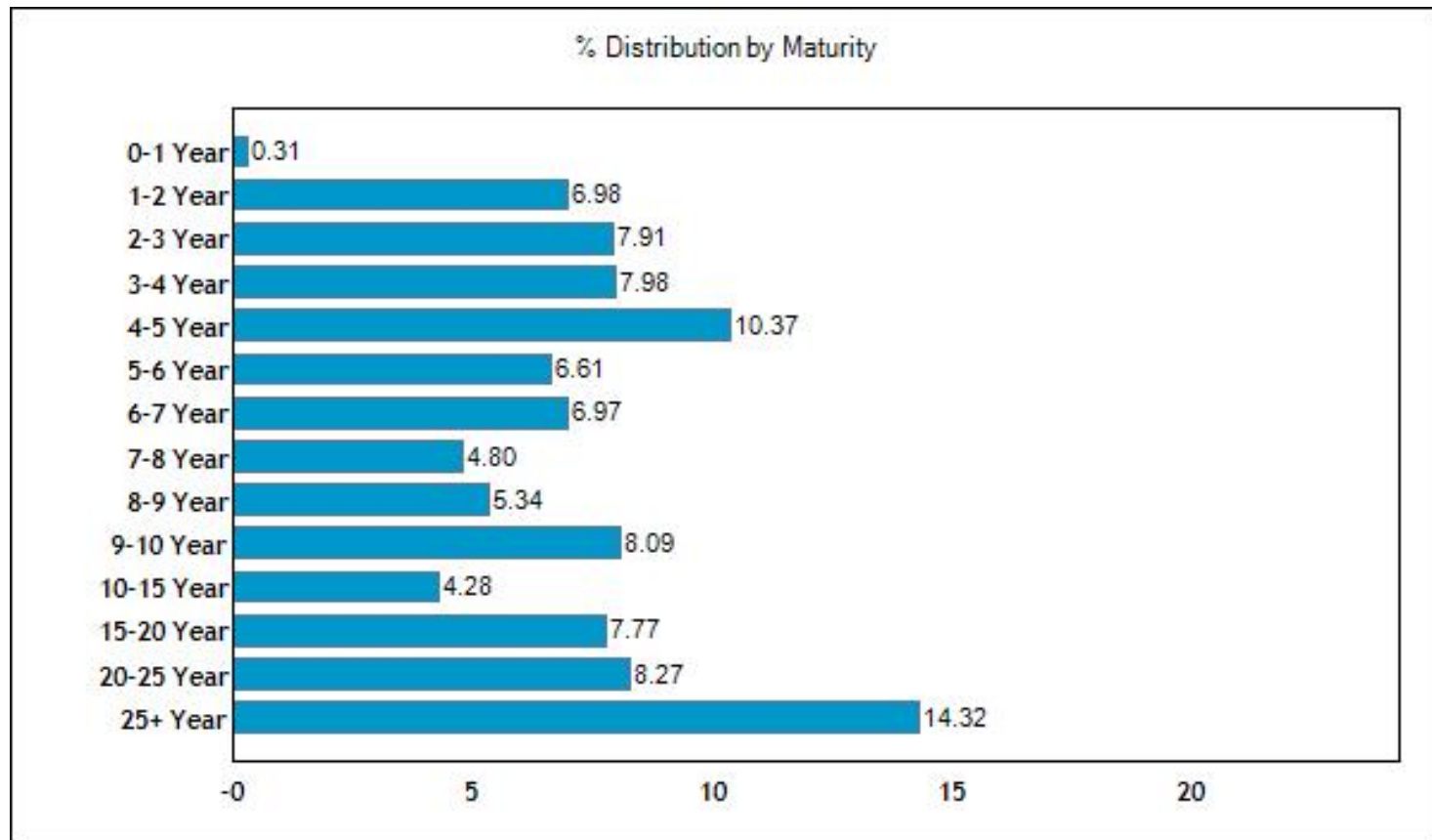
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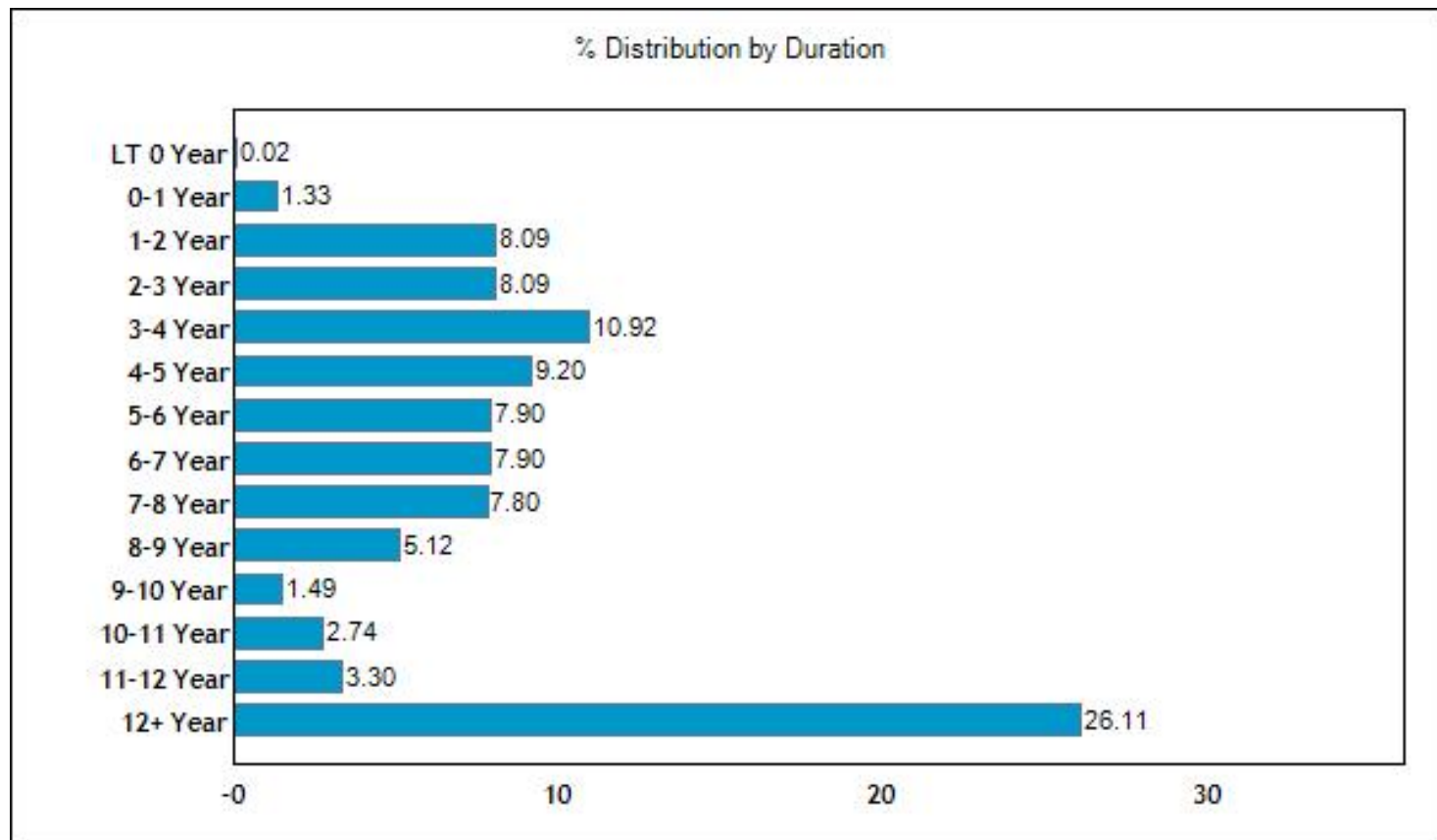
Index distribution by Rating	# Bonds	FullVal	%Full Val	Eff Dur	Contr EffDur	Eff Yld	OAS	TRR%MTD	ExRtn%MTD
AAA		1,047.041	0.02411	0.00	0.00	-0.01	0		
BBB	4,809	4,342,161.443	99.97589	8.03	8.03	2.46	117	0.828	0.148
Grand Total	4,809	4,343,208.485	100.00000	8.03	8.03	2.46	117	0.828	0.148



Index distribution by Maturity	# Bonds	FullVal	%Full Val	Eff Dur	Contr EffDur	Eff Yld	OAS	TRR%MTD	ExRtn%MTD
0-1 Year	21	13,484.123	0.31046	0.60	0.00	0.42	40	0.599	0.597
1-2 Year	408	303,171.644	6.98036	1.36	0.09	0.72	60	0.077	0.074
2-3 Year	409	343,725.704	7.91410	2.26	0.18	0.99	72	0.157	0.102
3-4 Year	432	346,554.802	7.97923	3.22	0.26	1.38	89	0.275	0.122
4-5 Year	481	450,581.084	10.37438	4.02	0.42	1.67	95	0.466	0.189
5-6 Year	325	287,206.644	6.61278	4.91	0.32	1.97	101	0.513	0.102
6-7 Year	345	302,641.002	6.96814	5.70	0.40	2.26	110	0.591	0.095
7-8 Year	218	208,410.950	4.79855	6.38	0.31	2.48	116	0.687	0.116
8-9 Year	276	231,916.922	5.33976	7.36	0.39	2.69	122	0.810	0.126
9-10 Year	391	351,391.718	8.09060	8.06	0.65	2.78	122	0.879	0.105
10-15 Year	209	185,716.744	4.27603	9.74	0.42	3.20	142	1.004	0.081
15-20 Year	317	337,600.910	7.77308	12.01	0.93	3.63	164	1.308	0.216
20-25 Year	407	359,048.139	8.26689	14.51	1.20	3.79	161	1.571	0.281
25+ Year	570	621,758.098	14.31564	17.14	2.45	3.77	154	1.696	0.188
Grand Total	4,809	4,343,208.485	100.00000	8.03	8.03	2.46	117	0.828	0.148

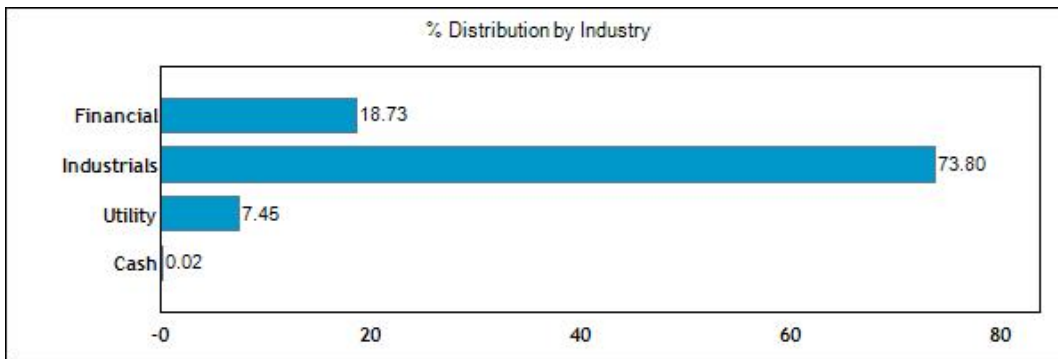


Index distribution by Duration	# Bonds	FullVal	%Full Val	Eff Dur	Contr EffDur	Eff Yld	OAS	TRR%MTD	ExRtn%MTD
LT 0 Year	1	668.146	0.01538	-0.28	0.00	3.16	292	0.846	1.006
0-1 Year	78	57,768.153	1.33008	0.61	0.01	0.77	58	0.187	0.194
1-2 Year	465	351,176.241	8.08564	1.53	0.12	0.78	64	0.080	0.070
2-3 Year	424	351,488.084	8.09282	2.50	0.20	1.13	80	0.183	0.109
3-4 Year	520	474,305.838	10.92063	3.54	0.39	1.51	91	0.364	0.165
4-5 Year	461	399,765.292	9.20438	4.48	0.41	1.84	100	0.489	0.137
5-6 Year	396	342,994.584	7.89726	5.46	0.43	2.16	106	0.569	0.098
6-7 Year	370	343,162.477	7.90113	6.43	0.51	2.49	117	0.689	0.110
7-8 Year	368	338,619.008	7.79652	7.55	0.59	2.79	128	0.856	0.144
8-9 Year	271	222,467.849	5.12220	8.52	0.44	2.83	121	0.879	0.054
9-10 Year	87	64,546.441	1.48615	9.40	0.14	3.03	129	0.989	0.081
10-11 Year	143	118,903.352	2.73768	10.53	0.29	3.46	159	1.172	0.185
11-12 Year	110	143,482.551	3.30361	11.39	0.38	3.54	159	1.280	0.230
12+ Year	1,115	1,133,860.467	26.10652	15.79	4.12	3.74	155	1.613	0.214
Grand Total	4,809	4,343,208.485	100.00000	8.03	8.03	2.46	117	0.828	0.148



Index distribution by Industry	# Bonds	FullVal	%Full Val	Eff Dur	Contr EffDur	Eff Yld	OAS	TRR%MTD	ExRtn%MTD
Banking	348	399,906.314	9.20762	5.92	0.54	2.14	116	0.628	0.157
Brokerage	61	81,879.132	1.88522	5.81	0.11	2.01	102	0.784	0.310
Cons/Comm/Lease Financing	133	102,069.006	2.35008	3.92	0.09	1.94	127	0.482	0.213
Investments & Misc Financial Services	134	91,395.785	2.10434	6.10	0.13	2.09	109	0.632	0.136
Financial Services (Sub Total)	328	275,343.923	6.33964	5.20	0.33	2.01	113	0.622	0.216
Insurance Brokerage	23	13,652.899	0.31435	8.20	0.03	2.28	93	0.861	0.159
Life Insurance	71	47,054.749	1.08341	7.37	0.08	2.97	162	0.827	0.198
Monoline Insurance	9	4,210.911	0.09695	5.88	0.01	2.30	121	0.528	0.026
Multi-Line Insurance	33	31,369.383	0.72226	9.65	0.07	2.58	108	0.938	0.095
P&C	58	29,484.294	0.67886	9.85	0.07	2.75	127	1.183	0.341
Reinsurance	25	12,466.378	0.28703	8.22	0.02	2.94	152	0.900	0.173
Insurance (Sub Total)	219	138,238.614	3.18287	8.53	0.27	2.74	133	0.929	0.193
Financial (Total)	895	813,488.851	18.73014	6.12	1.15	2.20	118	0.677	0.183
Auto Loans	59	50,536.424	1.16357	3.39	0.04	1.34	79	0.353	0.139
Auto Parts & Equipment	14	8,596.796	0.19794	7.77	0.02	2.30	101	0.904	0.244
Automakers	61	63,159.159	1.45421	5.63	0.08	2.01	108	0.807	0.369
Automotive (Sub Total)	134	122,292.380	2.81572	4.85	0.14	1.75	95	0.626	0.265
Building & Construction	22	12,548.491	0.28892	4.79	0.01	1.81	93	0.535	0.157
Building Materials	44	23,596.526	0.54330	9.23	0.05	2.63	114	1.136	0.333
Chemicals	146	111,950.013	2.57759	8.78	0.23	2.54	117	0.964	0.218
Forestry/Paper	26	16,935.778	0.38994	7.43	0.03	3.13	181	0.204	-0.440
Metals/Mining Excluding Steel	90	74,783.848	1.72186	8.61	0.15	3.01	156	0.739	-0.008
Steel Producers/Products	37	19,427.031	0.44730	5.76	0.03	2.12	119	0.429	-0.019
Basic Industry (Sub Total)	365	259,241.687	5.96890	8.26	0.49	2.65	131	0.804	0.099
Aerospace/Defense	136	144,797.781	3.33389	9.07	0.30	2.57	113	1.079	0.297
Diversified Capital Goods	75	80,428.874	1.85183	8.53	0.16	2.48	105	0.863	0.112
Machinery	58	34,103.119	0.78521	7.49	0.06	2.13	90	0.869	0.240
Packaging	42	26,254.407	0.60449	8.58	0.05	2.45	102	0.884	0.135
Capital Goods (Sub Total)	311	285,584.182	6.57542	8.68	0.57	2.48	107	0.975	0.223
Beverage	90	117,404.892	2.70318	10.57	0.29	2.71	110	0.869	-0.054
Food - Wholesale	118	86,691.550	1.99603	7.53	0.15	2.09	88	0.814	0.181
Personal & Household Products	31	15,651.210	0.36036	6.64	0.02	2.05	94	0.704	0.156
Tobacco	51	66,827.499	1.53867	8.91	0.14	2.83	142	0.958	0.197
Consumer Goods (Sub Total)	290	286,575.152	6.59824	9.05	0.60	2.51	110	0.864	0.087
Energy - Exploration & Production	64	51,575.176	1.18749	7.33	0.09	2.80	152	0.953	0.320
Gas Distribution	325	274,189.765	6.31307	8.26	0.52	2.85	150	1.200	0.501
Integrated Energy	75	79,315.362	1.82619	7.89	0.14	3.25	191	0.758	0.086
Oil Field Equipment & Services	12	12,303.279	0.28328	10.60	0.03	3.45	172	1.255	0.320
Oil Refining & Marketing	54	46,442.505	1.06931	7.75	0.08	2.74	145	0.871	0.217
Energy (Sub Total)	530	463,826.088	10.67934	8.10	0.87	2.92	157	1.065	0.376
Health Facilities	29	27,049.416	0.62280	8.81	0.05	2.58	122	1.028	0.286
Health Services	71	85,002.005	1.95712	8.37	0.16	2.22	89	0.813	0.100
Managed Care	73	73,230.224	1.68609	9.47	0.16	2.32	88	1.006	0.196
Medical Products	80	64,364.717	1.48196	8.30	0.12	2.12	80	0.838	0.125
Pharmaceuticals	147	223,860.177	5.15426	9.27	0.48	2.29	89	0.820	0.029
Healthcare (Sub Total)	400	473,506.538	10.90223	8.98	0.98	2.27	90	0.862	0.095
Gaming	9	11,834.484	0.27248	4.46	0.01	2.35	153	0.405	0.074
Hotels	22	13,881.061	0.31960	5.78	0.02	2.60	151	0.646	0.154
Recreation & Travel	8	7,367.917	0.16964	5.48	0.01	2.38	133	0.564	0.108
Leisure (Sub Total)	39	33,083.463	0.76173	5.24	0.04	2.46	148	0.542	0.115
Advertising	18	15,698.593	0.36145	7.42	0.03	2.37	117	0.872	0.251
Cable & Satellite TV	63	86,531.681	1.99234	10.18	0.20	3.08	149	0.956	0.071
Media Content	39	34,413.443	0.79235	10.67	0.08	2.88	124	0.963	0.029
Media (Sub Total)	120	136,643.717	3.14615	9.99	0.31	2.95	139	0.948	0.081
RealEstate Dev & Mgt	7	3,663.293	0.08435	6.63	0.01	2.48	126	0.640	0.050
REITs	362	205,542.094	4.73249	6.61	0.31	2.27	111	0.756	0.191
Real Estate (Sub Total)	369	209,205.386	4.81684	6.61	0.32	2.28	111	0.754	0.189
Department Stores	13	7,453.297	0.17161	5.85	0.01	2.74	168	0.136	-0.336
Discount Stores	9	8,068.186	0.18577	5.53	0.01	1.63	68	0.646	0.209
Food & Drug Retailers	43	32,198.697	0.74136	8.93	0.07	2.47	107	1.245	0.483
Restaurants	45	40,511.437	0.93275	9.93	0.09	2.36	85	1.047	0.187
Specialty Retail	74	51,325.799	1.18175	7.44	0.09	2.13	89	0.657	0.018
Retail (Sub Total)	184	139,557.416	3.21323	8.31	0.27	2.28	95	0.877	0.166
Environmental	31	18,520.031	0.42641	8.68	0.04	2.09	71	0.904	0.149
Support-Services	54	34,496.729	0.79427	6.37	0.05	2.19	106	0.673	0.145
Services (Sub Total)	85	53,016.759	1.22068	7.17	0.09	2.15	94	0.754	0.146

Electronics	92	93,473.517	2.15218	6.70	0.14	2.20	106	0.722	0.160
Software/Services	61	101,198.443	2.33004	9.03	0.21	2.40	103	0.572	-0.205
Tech Hardware & Equipment	45	53,205.751	1.22503	5.99	0.07	2.23	118	0.623	0.137
<i>Technology & Electronics (Sub Total)</i>	<i>198</i>	<i>247,877.710</i>	<i>5.70725</i>	<i>7.50</i>	<i>0.43</i>	<i>2.29</i>	<i>108</i>	<i>0.639</i>	<i>0.006</i>
Telecom - Satellite	3	1,635.973	0.03767	8.17	0.00	2.74	156	0.666	0.015
Telecom - Wireless	43	72,303.198	1.66474	9.97	0.17	2.70	117	0.674	-0.194
Telecom - Wireline Integrated & Services	151	268,970.775	6.19290	11.48	0.71	2.86	117	0.772	-0.243
<i>Telecommunications (Sub Total)</i>	<i>197</i>	<i>342,909.947</i>	<i>7.89531</i>	<i>11.14</i>	<i>0.88</i>	<i>2.82</i>	<i>117</i>	<i>0.751</i>	<i>-0.232</i>
Air Transportation	11	21,881.311	0.50381	3.93	0.02	2.68	187	0.542	0.269
Rail	107	67,846.511	1.56213	12.58	0.20	2.66	95	1.512	0.424
Transport Infrastructure/Services	37	27,973.736	0.64408	7.62	0.05	3.09	180	0.578	-0.070
Trucking & Delivery	51	34,128.049	0.78578	7.83	0.06	2.02	85	0.941	0.304
<i>Transportation (Sub Total)</i>	<i>206</i>	<i>151,829.607</i>	<i>3.49579</i>	<i>9.35</i>	<i>0.33</i>	<i>2.60</i>	<i>122</i>	<i>1.070</i>	<i>0.283</i>
Industrials (Total)	3,428	3,205,150.032	73.79683	8.54	6.30	2.52	117	0.861	0.130
Electric-Distr/Trans	67	31,150.342	0.71722	9.03	0.06	2.94	144	1.006	0.220
Electric-Generation	30	22,893.477	0.52711	6.69	0.04	3.32	205	0.529	-0.037
Electric-Integrated	332	236,897.883	5.45444	7.38	0.40	2.36	113	0.855	0.232
Non-Electric Utilities	57	32,580.858	0.75016	9.61	0.07	2.72	118	1.282	0.441
Utility (Total)	486	323,522.561	7.44893	7.72	0.57	2.52	123	0.889	0.233
Corporate (Total)	4,809	4,342,161.443	99.97589	8.03	8.03	2.46	117	0.828	0.148
Cash		1,047.041	0.02411	0.00	0.00	-0.01	0		
Grand Total	4,809	4,343,208.485	100.00000	8.03	8.03	2.46	117	0.828	0.148



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EXHIBIT 47



Europe Markets

News & Commentary

European stock markets end mildly higher; TNT shares tumble after company cuts outlook at express unit

Aude Lagorce, MarketWatch

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529 words

8 April 2011

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MarketWatch

MRKWC

English

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LONDON (MarketWatch) — European markets advanced Friday, buoyed by a rally in Japanese stocks overnight and solid gains for the mining sector as precious-metal prices rose once again.

The Stoxx Europe 600 index closed up 0.3% at 281.7. The benchmark finished 0.3% lower Thursday after Japan was shaken by another earthquake, and the European Central Bank raised interest rates for the first time in nearly three years, as expected.

In Japan, stocks rallied Friday as jitters calmed following the quake.

"There was relief in Asia after the tsunami warning was lifted and that carried on to the European markets," said Oliver Gilvarry, head of research at Dolmen Stockbrokers.

"The interest-rate hike from the ECB and the Portuguese news were well priced in so there is nothing negative strongly affecting sentiment," he added.

Miners advanced Friday, helped by news that **Rio Tinto PLC** has clinched a majority interest in long-pursued **Riversdale Mining**, boosting chances its takeover offer will be approved.

Rio shares rose 3.2%. Elsewhere in the sector, Kazakhmys PLC added 1.9% and BHP Billiton PLC gained 2.7%.

Gold prices rose once again as a weaker dollar and concerns about inflation led investors to seek refuge in precious metals. Copper and silver prices also advanced.

Shares of gold miner African Barrick Gold PLC gained 3.4% and Randgold Resources added 2.1%. Silver miner Fresnillo PLC climbed 2.4%.

There were a few large individual movers Friday.

Dutch mail and parcel-delivery company TNT N.V. dropped nearly 13% after the group cut the outlook for its express division, citing the sharp increase in the oil price, political unrest and natural disasters. TNT said it will push ahead with the spinoff of the unit next month nonetheless.

In France, shares of Lafarge SA, the world's biggest cement maker, rose 1.9%. Reuters reported Thursday that the European arm of the group's plaster unit has attracted interest from private-equity funds, citing sources.

The CAC 40 index advanced 0.8% to 4,061.91, led by Vallourec SA. Shares of the steel-tube maker rose 4.7% after Credit Suisse lifted its rating on the stock to outperform from neutral to reflect the "high growth" it expects the company to deliver compared with peers.

In Germany, the DAX 30 gained 0.5% to 7,217.02, led by gains for exchange operator Deutsche Boerse AG, up 2.9%.

The U.K.'s FTSE 100 benchmark closed up 0.8% at 6,055.75, led by miners and shares of defensive stocks like utility Scottish & Southern Energy PLC , up 2.3%.

On the downside, shares of interdealer broker ICAP PLC sagged nearly 4% after Credit Suisse cut its rating on the stock to underperform from neutral, citing the stock's full valuation.

European shares rise on Friday, buoyed by a rally in Japanese stocks overnight and a surge in precious-metal prices.

Document MRKWC00020110408e7480012x

EXHIBIT 48

THE WALL STREET JOURNAL.

DEPOSITION
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Miners Drive Europe's Gains

By Aude Lagorce

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LONDON—European markets advanced Friday, buoyed by solid gains for the mining sector as metal prices rose once again.

Shares also recovered losses made Thursday when Japan was shaken by another earthquake late in the European session.

The Stoxx Europe 600 index closed up 0.3% at 281.68, its 11th gain in the last 13 sessions. It had eased 0.3% on Thursday.

"There was relief in Asia after the tsunami warning was lifted and that carried on to the European markets," said Oliver Gilvarry, head of research at Dolmen Stockbrokers.

Among major national markets, the U.K.'s FTSE 100 benchmark closed up 0.8% at 6055.75 and The CAC 40 index advanced 0.8% to 4061.91.

Miners advanced, helped by news that **Rio Tinto** had clinched a majority interest in long-pursued **Riversdale** Mining, boosting chances its takeover offer will be approved. Rio shares rose 3.2%.

Gold prices rose once again as a weaker dollar and concerns about inflation led investors to seek refuge in precious metals. Copper and silver prices also advanced. African Barrick Gold gained 3.4% and Randgold Resources added 2.1%. Silver miner Fresnillo climbed 2.4%.

Dutch mail and parcel-delivery company TNT plunged 13% after the group cut the outlook for its express division, citing the sharp increase in the oil price, political unrest and natural disasters. TNT said it will push ahead with the spinoff of the unit next month nonetheless.

Vallourec, a maker of steel tubes, rose 4.7% after Credit Suisse lifted its rating on the stock to outperform from neutral to reflect the "high growth" it expects the company to deliver compared with peers.

Cement giant Lafarge rose 1.9%. Reuters reported Thursday that the European arm of the group's plaster unit has attracted interest from private-equity funds, citing sources.

In Germany, the DAX 30 gained 0.5% to 7217.02, led by a 2.9% gain in exchange operator Deutsche Börse.

ICAP sagged 3.9% after Credit Suisse cut its rating on the interbank broker-dealer to underperform from neutral, citing the stock's full valuation.

Earlier, Asian stock markets closed mostly higher Friday, as Fast Retailing, operator of the Uniqlo clothing chain, led the Tokyo bourse's sharp turn higher.

U.S. stocks were little changed. The Dow Jones Industrial Average was down four points at 12406 at midday. Alcoa fell 0.4% ahead of Monday's earnings report, the unofficial kick-off of the first quarter corporate filings season. The Nasdaq Composite Index shed 0.1% to 2794. The Standard & Poor's 500-stock index rose one point to 1334, led by the energy sector as oil prices jumped.

The euro recently fetched \$1.44122 from \$1.4304 late Thursday in New York, and the dollar was at ¥84.97, from ¥84.93.

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EXHIBIT 49



London Markets

News & Commentary

Mining sector leads London stocks higher; ICAP falls after downgrade; Carnival shares also drop

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LONDON (MarketWatch) — The U.K. stock market posted strong gains on Friday, led higher by miners such as Anglo American PLC and Xstrata PLC, which were boosted by a rally in metals prices.

The FTSE 100 index rose 48.38 points, or 0.8%, to end at 6,055.75, as other European markets also advanced. See more on the move higher for bourses to cap off the trading week.

"The earnings that are coming through are still very good and reflect that the underlying recovery is proceeding very nicely," said Mike Lenhoff, chief strategist at Brewin Dolphin.

Also, signs are that the "Federal Reserve has no intention of raising interest rates for some while," he noted.

"Corporate confidence is very high and we're seeing that in mergers and acquisitions," he said.

As a result, investors seem to be shrugging off worries over high oil prices as well as Thursday's interest-rate hike by the European Central Bank, according to Lenhoff.

Miners ranked among the top gainers in London's benchmark index, as gold, silver and copper prices rose sharply. Shares of Anglo American rallied nearly 4%, Antofagasta PLC gained 1.9% and Xstrata rose 2.8%.

Meanwhile, Rio Tinto PLC rose 3.2% after the mining giant said it has acquired a majority interest in Riversdale Mining Ltd. . Rio Tinto's stake may increase further with its takeover offer for Riversdale remaining open until April 20.

Shares of Scottish & Southern Energy PLC gained 2.3% after Credit Suisse upgraded the firm to outperform from neutral.

In the financial sector, shares of Barclays PLC edged up 0.6%. The bank said late Thursday it plans to pump up to 1.3 billion euros (\$1.9 billion) into its Spanish unit in order to comply with higher capital requirements from the Bank of Spain.

U.K. banks also are awaiting Monday's report from the Independent Commission on Banking, which is considering reforms to the sector.

ICAP shares slide

Shares of interdealer broker ICAP PLC fell nearly 4%. Credit Suisse downgraded the firm to underperform from a neutral rating previously, citing valuation reasons.

Meanwhile, higher oil prices weighed on travel and leisure shares. Carnival PLC dropped 2.8% and International Consolidated Airlines Group fell 2.5%.

Also on the downside, shares of quality and safety services provider Intertek Group PLC dropped nearly 1% after J.P. Morgan Cazenove downgraded its rating to neutral from overweight.

“The group’s fundamental attractions remain undimmed; yet, near-term potential for further material share price appreciation looks more limited,” the broker said of Intertek in a research note.

Shares of publisher and information provider Reed Elsevier PLC edged up 0.4%, even as J.P. Morgan Cazenove cut its recommendation on the stock to neutral from overweight. The broker said that it still sees “many attractions” to the investment case underlying Reed Elsevier but that the shares’ valuation is now at an appropriate level.

The U.K. stock market ends higher, as a rally in metals prices boosts the mining sector.

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